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RABIES.

A REVIEW OF RECENT ARTICLES, XXIII.*

i. Virus.

It will be remembered that NICOLAU and KOPCIOWSKA[1] claimed that fixed virus could be retransformed into street virus by passage inoculations into the right sciatic nerve of emulsions obtained from the left sciatic nerve of the previous animal (this *Bulletin*, Vol. 31, p. 637). They have repeated this experiment using the ordinary Pasteur strain of fixed virus with the same result—namely a progressive increase in the number and size of the Negri bodies. KOPCIOWSKA[2] in an additional paper states that the phenomenon of "septinévrite" is also gradually increased. Thus with the retransformed virus emulsions of the nerve trunks were found to be constantly infective—25 out of 25—whereas with fixed virus the proportion was 10 out of 13. This is considered to be additional evidence that the virus has been retransformed.

MANOUÉLIAN[3] restates his view that the virulence of the saliva in rabies depends upon the presence of virus in the neurones of the salivary glands, and of the mucosa of the tongue. These neurones lie close to the surface, and a slight abrasion may set them free.

REMLINGER and BAILLY[4] find that the Tangier strain of fixed virus has become less resistant to drying during the course of passaging. In 1923 when the virus was in its 2200th passage, cords dried for 6 and 5 days were never virulent, whereas of 15 cords dried for 4 days 7 were virulent. The experiment has been repeated in 1934, when the virus was in its 2670th passage. At this date 4-day dried cords were never virulent (0 in 12) whilst of 30 cords dried for 3 days 10 were virulent. Similarly, resistance to the action of glycerine has been reduced.

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* For the twenty-second of this series see Vol. 32, p. 173.

[1] NICOLAU (S.) & KOPCIOWSKA (L.). Sur la transformation du virus rabique fixe en virus des rues.—*C. R. Soc. Biol.* 1935. Vol. 119. No. 17. pp. 140–143. With 1 fig.

[2] KOPCIOWSKA (L.). Septinévrite à virus rabique fixe "ramené en arrière" (transformé apparemment en virus des rues).—*C. R. Soc. Biol.* 1935. Vol. 119. No. 17. pp. 143–146. With 1 fig. [10 refs.]

[3] MANOUÉLIAN (Yervante). Neurones virulents et infection de la salive au cours de la rage.—*C. R. Soc. Biol.* 1935. Vol. 119. No. 18. pp. 256–257.

[4] REMLINGER (P.) & BAILLY (J.). Influence des passages de lapin à lapin sur la sensibilité du virus rabique à la dessiccation et à la glycérine.—*C. R. Soc. Biol.* 1935. Vol. 118. No. 12. pp. 1206–1208.

The effects of subpassage on the resistance of the virus to ether and to dilution are described in a second communication.[5] It is shown that the resistance to ether increases as a function of the number of passages. In 1919 brain substance immersed in ether remained virulent for about 70 hours, now it is still virulent after 215 hours immersion. A similar increase is found to apply to dilution. REMLINGER and BAILLY believe that the confliction between these two results is more apparent than real. The effect of passage is to adapt the virus to the nervous substrate. Thus with passage the concentration of the virus, and in particular the concentration of young forms especially sensible to physical agencies such as desiccation, increases. Thus the effect of desiccation will increase with passage. Glycerine is not an antiseptic, but more a physical agency acting in virtue of its hygroscopic effects. Its action consequently increases with sub-passage, as the concentration of young forms becomes greater. Dilution on the other hand acts not by attenuation but by repartition, and ether—being an antiseptic—acts proportionately to the concentration of the virus. As the effect of subpassage is to increase the concentration of the virus, it takes an increasing period of time for complete disinfection to be achieved.

ANDO[6] from a lengthy series of experiments finds that the incubation periods of different strains of fixed virus vary considerably. The infectivity to subcutaneous and intraplantar injection also varies. Some viruses are relatively weak when inoculated subcutaneously but show a high degree of virulence when introduced intracerebrally. There is also variability as regards the occurrence and types of the Negri bodies which are found in the inoculated animal (dog, rabbit or guineapig), some strains producing the larger forms seen in street virus infection. The fixed virus strains could not be serologically differentiated by means of rabicidal sera.

An interesting series of graphs showing the rise and fall of rabicidal power of the serum after immunization is given in the second section of this paper. For example the dilution of serum which inactivated "a definite quantity" of an emulsion of virus filtered through a Berkefeld V, and kept in contact *in vitro* for 2 hours at 37°C. was in one instance 1/4 on the 15th day, 1/16 on the 20th day, 1/64 on the 30th day, 1/128 on the 45th day, 1/32 on the 65th day, and 1/16 on the 90th day. With strains of short incubation the serum showed rabicidal properties earlier than with strains of long incubation, and fixed virus vaccine which had undergone few subpassages acted earlier than did vaccines which had undergone many subpassages.

In the third section ANDO discusses the question of the selection of a suitable strain of fixed virus for treatment. He considers that the strain must be "freshly fixed" and have a short incubation period. Its power of producing rabicidal substances as well as its power of protection should be tested. Its virulence should be tested by subcutaneous, intraplantar and intracerebral inoculation. Its peculiarities as regards Negri body production should also be investigated.

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[5] REMLINGER (P.) & BAILLY (J.). Influence des passages de lapin à lapin sur la sensibilité du virus rabique à l'éther et à la dilution.—*C. R. Soc. Biol.* 1935. Vol. 119. No. 16. pp. 29–31.

[6] ANDO (Keizaburo). Untersuchungen ueber Virus-fixe der Lyssa. I. Virulenz des Virus-fixe und seine Klassifikation.—*Japanese Jl. Experim. Med.* 1935. Apr. 20. Vol. 13. No. 2. pp. 125–147. II. Vergleichende Immunisierungsversuche mit Virus-fixe Stämmen.—*Ibid.* pp. 149–157. With 9 figs. III. Ueber Virus-fixe-Stämme und ihre Auswahl.—*Ibid.* pp. 159–165. [78 refs.]

It will be remembered (this *Bulletin*, Vol. 31, p. 638) that SHORTT and BROOKS found that 10 minutes exposure of suspensions of fixed virus brain tissue to the photo-dynamic action of solutions of methylene blue completely inactivated the virus, whereas according to GALLOWAY's experiments the virus was inactivated in collodion membranes, or sand and paper-pulp filtrates, but not in unfiltered suspensions. GALLOWAY also found that after exposure the virus retained its antigenic value. The former authors[7] have been unable to confirm this latter result. They find from experiments on 114 rabbits that the antigenic value is greatly impaired. They suggest that " if the photodynamic action of methylene blue is to be of any use in the preparation of vaccines its action must stop short of complete inactivation in the sense of a dead virus." As a source of light SHORTT and BROOKS used sunlight, and GALLOWAY a 300 candle power filament lamp. SANKARAN and BEER[8] have now carried out a series of experiments in which a Quartz Mercury Vapour lamp was the source of radiation. They find that exposure of a 5 per cent. suspension of rabies infected brain to this radiation inactivates the virus in 10 minutes, and that this occurs even in the absence of methylene blue. Further experiments are being carried out to determine the physical basis of this phenomenon, and experiments are also in progress to determine whether the inactivated virus has retained its antigenic properties.

A similar result has been obtained by LEVADITI.[9] The virus *in vitro* was destroyed in 5 minutes. Further experiments were carried out *in vivo*. It appeared that a single application of the lamp for 10 minutes to the cornea (after corneal inoculation) did not prevent infection in the case of 7 out of 9 rabbits irradiated immediately, 4, 24 and 48 hours and 3 days after inoculation. Three applications, each of 10 minutes duration, saved 4 out of 6 rabbits. The animals which survived from the former experiments were not immune to further infection. The author draws attention to the fact that the passage of the virus from the site of inoculation (neuroprobasie) must be extremely rapid.

In an article by LIMA[10] are recapitulated the results of his experiments upon the transmission of the rabies of Matto Grosso by the vampire bat (this *Bulletin*, Vol. 31, p. 637).

REMLINGER and BAILLY[11] in continuance of their article (this *Bulletin*, Vol. 31, p. 639) present further results of their investigation of the pseudo rabies of AUJESZKY. The virus is sometimes found in the

[7] SHORTT (H. E.) & BROOKS (A. G.). Note on Rabies Fixed Virus as an Antigenic Agent when Inactivated by the Photodynamic Action of Methylene Blue. —*Indian Jl. Med. Res.* 1935. Jan. Vol. 22. No. 3. pp. 557–560.

[8] SANKARAN (G.) & BEER (W. A.). The Effect of Exposure of Suspensions of Rabies-infected Brain to Radiation from a Quartz Mercury Vapour Lamp. —*Indian Jl. Med. Res.* 1935. Jan. Vol. 22. No. 3. pp. 581–594. With 2 figs. on 1 plate. [13 refs.]

[9] LEVADITI (C.). Etude de la " neuroprobasie " des virus de l'herpès et de la rage, au moyen du rayonnement total de la lampe à mercure.—*Bull. Acad. Méd.* 1935. Jan. 29. 99th Year. 3rd Ser. Vol. 113. No. 4. pp. 127–139. With 2 figs. [25 refs.]

[10] LIMA (Queiroz). A transmissão da raiva dos herbívoros pelos morcegos hematophagos da familia Desmodontidae.—*Rev. Depart. Nac. da Producção Animal.* Rio de Janeiro. 1934. Vol. 1. Nos. 2, 3 & 4. pp. 165–173. With 11 figs. & 1 folding diagram. English summary.

[11] REMLINGER (P.) & BAILLY (J.) Contribution à l'étude du virus de la maladie d'Aujeszky.—*Ann. Inst. Pasteur.* 1935. Feb. Vol. 54. No. 2. pp. 149–184.

blood, sometimes in the nervous system. It is more frequently found in the spleen, the liver, the testicle, the suprarenals, and the bone marrow than is the virus of rabies. The saliva, bile, urine and faeces are never infective. The virus is highly resistant to desiccation, but is destroyed by heating at 60°C. for 50 minutes. It is well preserved in glycerine. It passes L1, L2 and L3 Chamberland, but not Berkefeld V bougies. It is not brought down by centrifugation, and is highly diffusible. For diagnostic purposes the author recommends the rabbit and the cat.

In a long article copiously illustrated BRAGA and FARIA[12] cover much the same ground. Their results, from original observations, need not be recapitulated. It is an admirable summary of the features of the disease and well worthy of study.

A short "text book" description of pseudo-rabies is also given by GENTILUCCI.[13]

A description of pseudo-rabies as it occurs in Spain is given by STEINER and LÓPEZ.[14] Organs from 10 cases were examined, and the conclusion arrived at that the disease exists as an epizootic amongst the cattle of that country.

ii. Symptomatology and Diagnosis.

An interesting case of paralytic rabies simulating an ascending paralysis of the Landry type is reported by DOROLLE, CHAUSSINAND and TRAN-VAN-TAM.[15] The patient came to hospital at Saigon, 33 days after having been bitten on the thumb by a dog suffering from furious rabies. The patient had experienced pain in the bitten thumb and the corresponding arm for 3 days previously. He drank with difficulty, and pharyngeal reflexes were rather exaggerated. He was given antirabic treatment by the dried cord method, and intravenous injections of "somnifene." Five days after admission paresis of the lower limbs became evident, reflexes were abolished, and constipation and retention of urine set in. The paralysis gradually ascended and on the 13th day the diaphragm became involved, and the patient died from cardiac syncope. Appearances of encephalitis were observed post-mortem, but no Negri bodies were found in the horn of Ammon. Two rabbits inoculated died of rabies, after an incubation of 14 days.

The case was characterized by the absence of spasm, by the long duration after symptoms had set in, and by their ascending paralytic nature.

For the rapid diagnosis of rabies by animal experiment WEBSTER and DAWSON[16] recommend the following procedure. A portion of the

[12] BRAGA (Americo) & FARIA (Ascanio). Paralysia bulbar infectuosa (pseudo-raiva, "peste de coçar," doença de Aujeszky). (Terceira nota.)—*Rev. Depart. Nac. da Producção Animal.* Rio de Janeiro. 1934. Vol. 1. Nos. 2, 3 & 4. pp. 53–124. With 27 figs. [65 refs.] English summary (2½ pages).

[13] GENTILUCCI (Anton Stefano). La pseudo-rabbia (paralisi bulbare infettiva). —*Ann. d'Igiene.* 1935. Jan. Vol. 45. No. 1. pp. 48–53. [23 refs.]

[14] STEINER (A.) & LÓPEZ (C.). Descubrimiento de la enfermedad de Aujeszky en España.—*Rev. Higiene y San. Pecuarias.* 1935. Apr.–May. Vol. 25. No. 4–5. pp. 330–334. [22 refs.]

[15] DOROLLE, CHAUSSINAND (R.) & TRAN-VAN-TAM. Un cas de rage paralytique à évolution lente (paralysie ascendante type Landry).—*Bull. Soc. Path. Exot.* 1935. Feb. 13. Vol. 28. No. 2. pp. 78–81.

[16] WEBSTER (L. T.) & DAWSON (J. R.), Jr. Early Diagnosis of Rabies by Mouse Inoculation. Measurement of Humoral Immunity to Rabies by Mouse Protection Test.—*Proc. Soc. Experim. Biol. & Med.* 1935. Jan. Vol. 32. No. 4. pp. 570–573.

horn of Ammon is emulsified and injected intracerebrally and intraperitoneally into mice. After 5 to 8 days the mouse is killed and smears from the cornu ammonis are examined for Negri bodies.

iii. Pathology.

Using the staining method of MUROMZEFF (smears: 1-2 hours fixation in methyl alcohol: 10–15 minutes in a 2 per cent. dilution of Mann's strain: without washing 10 minutes in 10 per cent. tannin: a few seconds in abs. alcohol: dried Negri bodies bright violet on a pale blue ground), PALAWANDOW, SEREBRENNAJA and PUGATSCH[17] were able to demonstrate the presence of Negri bodies in 100 per cent. of mice, dogs, marmots and hedgehogs, in 80 per cent. of rats and in 75 per cent. of guineapigs infected with fixed virus. In rabbits the percentage was 35 with Kieff fixed virus, 61 with Odessa fixed virus, and 78 per cent. with Sassari fixed virus. They do not regard the power of fixed virus to develop Negri bodies as a reversibility towards street virus since the features of the illness were those of ordinary fixed virus infection.

From photographs taken with infra red rays GUARDABASSI[18] finds that Negri bodies have a granular or filamentous structure; the granules appear usually to be oriented with regard to a point on the periphery. These morphological appearances lead to the view that the body is not the result of a cellular reaction against the virus, but is rather an organic complex, probably a stage in the cycle of evolution of a microorganism.

MATSUDA[19] has continued his observations on the intestinal changes in the rabid rabbit (see this *Bulletin*, Vol. 32, p. 177). The first part of this communication deals with the pathology of the intestinal canal, and the appearances of an acute enteritis are described. These were localized mainly to the portion of the canal between the duodenum and the ileum. The second part deals with symptomatology. A rise of temperature was observed two days before the onset of paralysis. This was accompanied by a slight fall in body weight, by diarrhoea, rhinorrhoea and salivation.

JONNESCO[20] cites the case of a dog which after having resisted intraocular inoculation of a strain of a reinforced virus J, received in succession nine intracerebral inoculations of 1 cc. of a 1 in 50 dilution of fixed virus. He concludes that the dog had a natural immunity. After the 4th inoculation, one part of its serum neutralized 9 parts of an emulsion of fixed virus; after the 6th inoculation it neutralized

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[17] PALAWANDOW (Haydar), SEREBRENNAJA (A. I.) & PUGATSCH (E. M.). Ueber das Vorkommen und die Eigentümlichkeiten der Negrikörper bei virus fixe.—*Ztschr. f. Hyg. u. Infektionskr.* 1934. Dec. 22. Vol. 116. No. 5. pp. 433–438.

[18] GUARDABASSI (M.). Sur la structure des corps de Negri dans les photomicrographies à l'infrarouge.—*C. R. Soc. Biol.* 1935. Vol. 118. No. 6. pp. 559–561. With 5 figs.

[19] MATSUDA (Shoitsu). The Contribution on the Knowledge of the Experimental Rabies (Report II). I. Pathological Study on the Intestinal of the Hydrophobic Rabbit. II. Study on the Clinical Symptoms of the Hydrophobic Rabbits.—*Oriental Jl. Dis. Infants.* 1934. Sept. Vol. 16. No. 2. [In Japanese. English summaries pp. 12–15.]

[20] JONNESCO (Démètre). Recherches sur l'immunité naturelle du chien contre la rage et sur les neurotoxines.—*Ann. Inst. Pasteur.* 1934. Dec. Vol. 53. No. 6. pp. 664–680. With 1 fig. [25 refs.]

19 parts. A small fragment of brain was extracted after the 4th intracerebral inoculation and was found to be infective ; a portion of submaxillary gland excised at the same time did not contain the virus. A continued increase in the number of eosinophils in the blood was also observed. The authors consider the degree of eosinophilia to be an indication of the degree of immunity. The virus was also shown to be present in the blood serum 17 days after the 4th intracerebral inoculation. In the second part of this paper JONNESCO finds that sensitization by inoculation of a neurotoxic serum lowers resistance to intracerebral inoculation of rabies. Of 13 guineapigs so sensitized, 3 were paralysed in 12 hours, 1 in 6 hours, and 8 between 3 and 7 days, after intracerebral inoculation with fixed virus ; whilst 4 rabbits all became paralysed on the following day. These observations are further discussed in a subsequent paper.[21] A neurotoxic serum was prepared by giving a dog 3 intracerebral inoculations at 8 days intervals of an emulsion of normal dog's brain. This produced similar effects to those above described. Control experiments showed that normal brain substance had no noxious effect upon previously sensitized animals. Thus the author concludes that the paralysis observed in sensitized animals was occasioned by the rabies virus, which diffuses and multiplies much more rapidly when nerve cells have been sensitized by a neurotoxin.

iv. Methods of Treatment and Statistics.

From a series of experiments on rabbits BAKI[22] concludes that immunity first appears, after treatment by Högyes' method, between the 11th and 20th day, and lasts for at least 5 months. In the case of those treated by Fermi's method it appears on the 10th day and is still complete after 2½ months. In the case of those treated by Alivisatos' method it appears on the 10th and is still complete after 2 months. In general animals which have been immunized intraperitoneally retained their immunity longer than those treated by intramuscular, intravenous or subcutaneous injections. Rabicidal substances were present in the serum by the 10th day after treatment by each of the three methods, and lasted longer than the immunity. In certain cases when the serum was rabicidal the animal was not immune, and in others when the animal was immune the serum was not rabicidal. The author concludes that the determination of the rabicidal power of the serum is not such a direct indication of immunity as the protection test. [It should be remarked that these conclusions are based upon experiments on 12 rabbits treated by Högyes' method, 6 rabbits treated by Fermi's method, and 6 by Alivisatos' method.]

SHORTT, MCGUIRE, BROOKS and STEPHENS[23] have carried out a series of experiments on methods of immunization against rabies.

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[21] JONESCO (Démètre). Résistance à la rage des animaux sensibilisés par le sérum neurotoxique.—*C. R. Soc. Biol.* 1935. Vol. 118. No. 15. pp. 1657–1658.

[22] BAKI (Sabri). Vergleichende Untersuchungen ueber verschiedene Immunisierungsverfahren bei Wut.—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1934. Sept. 18. Vol. 83. No. 3/4. pp. 184–196. [17 refs.]

[23] SHORTT (H. E.), MCGUIRE (J. P.), BROOKS (A. G.) & STEPHENS (E. D.). Anti-Rabic Immunization : Probable Lines of Progress in Improvement of Methods.—*Indian Jl. Med. Res.* 1935. Jan. Vol. 22. No. 3. pp. 537–556.

(1) In the first place they prepared a serum in the sheep and in the buffalo of such a titre that " in a 1 in 5 dilution it was capable of completely fixing not less than 8 minimum haemolytic doses of complement." (2) They then showed in a comparative experiment in which the various protein fractions of the serum were kept in contact *in vitro* with fixed virus that the rabicidal factors were in highest concentration in the euglobulin fraction of the serum. Thus with unconcentrated serum 5 out of 8 rabbits died of rabies, with the euglobulin fraction none out of 8, with the pseudoglobulin fraction 1 out of 8, and with the combined globulins 2 out of 8 died of rabies. (3) It appeared from another experiment that antirabic serum as an adjunct to treatment by carbolized vaccines, when given on the last two days of a 14-day treatment increased the mortality, whilst if given on the first two days the mortality was unaltered, though the average period of incubation was lengthened. (4) An attempt was then made to reduce the mortality of very severely bitten human cases by giving 20 cc. of antirabic serum on the first and second days in addition to the usual course of carbolized vaccine treatment. With serum in addition 7 out of 203 died of rabies (3·44 per cent.) and in the control set with vaccine alone 3 out of 67 (4·48 per cent.) contracted the disease. A confirmatory test was made on a group of persons bitten as described in Hempt's Class IV ; of those receiving serum+vaccine 5 out of 381 died, of those receiving only vaccine 4 out of 127 died. The combined results of these two experiments are as follows :—

	Number treated	Deaths	Mortality
Serum + vaccine	584	12	2·05
Vaccine only	194	7	3·60

[This result does not indicate a significant difference between the two methods of treatment.]

(5) In the next section of this paper the authors, following the procedure of FINDLAY for immunization against yellow fever, estimated the value of a single dose of live vaccine+antiserum in immunizing against rabies. The results of two consecutive experiments may be combined as follows. Of 40 monkeys treated with 1 cc. unconcentrated serum plus 0·5 cc. of a 10 per cent. live fixed virus 11 died of rabies (27·5 per cent.) after subsequent infection with street virus ; of 41 treated with 1 cc. of combined globulins plus the same dose of live virus 8 (or 20·5 per cent.) succumbed ; of 40 treated with 1 cc. of euglobulins plus the same dose of live vaccine 6 (15 per cent.) died of rabies ; of 39 treated with 1 cc. of pseudoglobulins plus live virus as before, 8 died of rabies (22·2 per cent.) ; of 37 treated with the same dose of live vaccine alone 5 contracted rabies (14·2 per cent.), whilst of 42 untreated control monkeys 26 (61·9 per cent.) died of rabies. The authors conclude that such a dose of vaccine+antiserum has a considerable immunizing value although the main effect appears to have been exerted by the live virus, the serum being used mainly to render the use of the live virus more safe. (Thus the numbers of monkeys which died of rabies prior to the inoculation of the infecting dose, were in the successive groups, 2, 1, 2, 3, 5, so that live vaccine alone caused

up to 5 deaths out of 42 monkeys, whilst when treated with antiserum, the numbers averaged 2 out of the same number.)

(6) Finally the effect of following a 7 days course of treatment by carbolized vaccine (10 cc. daily for large dogs, and 5 cc. daily for smaller dogs of a 6 per cent. vaccine) by a dose of 5 cc. of a 1 per cent. dilution of living Paris fixed virus after three weeks and a second 10 cc. dose after a further week's delay, in immunizing against a test dose of 1st passage street virus administered 10 days later, yielded the result that of 8 dogs so treated all escaped, whilst of 8 control dogs all died of rabies [a result of high significance]. The authors conclude that " future lines of advance towards an efficacious means of producing a solid immunity against rabies will be along a path of utilization of antirabic serum and fresh live fixed virus, possibly combined with the use of a dead vaccine."

Statistics regarding the results of treatment at Bandoeng (Dutch East Indies) are published by VAN STOCKUM.[24] These are of a very striking nature and will give those who are engaged in the administration of antirabic treatment much food for thought. VAN STOCKUM claims that " each treatment with the Högyes' method and this antigen guarantees almost absolute protection against cases of hydrophobia with an incubation period of more than 30 days." The antigen referred to is described as Monkey Brain (1st subpassage *Macacus cynomologus*) ; the total dosages at present employed are 212 mgm. over 30 days for Europeans and 407 mgm. over 25 days for natives.

The effect of treatment upon the incubation period has been examined by a number of workers ; some believe it to lead to a prolongation of the average incubation period, some to a shortening. The question is a complicated one ; on the one hand, one would imagine that the effect of treatment would be to lop off long incubation periods, whilst, on the other, the onset of symptoms might be delayed in those whom treatment fails to cure. These two influences would operate on the average incubation period in contrary directions ; the former would tend to shorten it, the latter to prolong it. Some years ago, from an examination of the periods of 282 fatal cases which occurred at Kasauli during the period 1912–1916, by comparing the incubation periods of those who commenced treatment during the 1st, 2nd and 3rd weeks after the bite, the reviewer believed that the effect of early treatment was to prolong the incubation period. This result is, however, not borne out in later statistics. It may be that the average incubations of those arriving during the various weeks are probably not so much a measure of the efficiency of treatment as an indication of the various influences which determine earliness of arrival, and these may vary from institute to institute. VAN STOCKUM claims that Monkey Brain vaccine lops off long incubations and has found no indication that the incubations of those who ultimately die are influenced one way or the other.

The results of the Bandoeng experience in the cases of those arriving during the 1st week may be tabulated as follows :—

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[24] VAN STOCKUM (Maria J.). New Principles of Antirabic Treatment and Rabies Statistics. A Statistical and Experimental Study. Vol. 1. 204 pp. 1935. The Hague : Martinus Nijhoff. [15s.]

TABLE I.

I = Pasteur method 1895–1905.
II = Högyes rabbit brain 1906–1908.
III = Högyes rabbit brain 1909–1916.
IV = Högyes monkey brain 1916–1932.

	Number treated	Deaths		Proportion of deaths <30 days to total (per cent.)	Mortalities		
		Total	incubation <30 days		Total	incubation <30 days	incubation >30 days
HEAD I ...	164	29	24	83	17·68	14·64	3·05
II ...	80	15	8	53	18·75	10·00	8·75
III ...	249	27	24	89	10·84	9·64	1·20
IV ...	253	20	19	95	7·91	7·51	0·40
ARM I ...	632	16	4	25	2·53	0·63	1·90
II ...	336	15	5	33	4·46	1·49	2·98
III ...	1,101	21	13	62	1·91	1·18	0·73
IV ...	1,074	8	8	100	0·75	0·75	0
LEG AND TRUNK I	593	20	2	10	3·37	0·34	3·03
II	281	6	1	17	2·13	0·36	1·78
III	1,120	8	2	25	0·71	0·18	0·54
IV	1,426	4	4	100	0·28	0·28	0
LIMBS I ...	1,225	36	6	17	2·94	0·49	2·45
II ...	617	21	6	29	3·40	0·97	2·43
III ...	2,221	29	15	52	1·31	0·68	0·63
IV ...	2,500	12	12	100	0·48	0·48	0
ALL POSITIONS I ...	1,389	65	30	46	4·68	2·16	2·52
II ...	697	36	14	39	5·17	2·01	3·16
III ...	2,470	56	39	70	2·27	1·58	0·69
IV ...	2,753	32	31	97	1·16	1·13	0·04

From this table it will be seen that the percentages of deaths with incubations of less than 30 days to the total deaths with monkey brain virus treatment, is in the case of those bitten on the arm 100, in the case of those bitten on the leg it is also 100, and in the case of those bitten on the head 95. These percentages are much higher than those obtained by other methods of treatment at Bandoeng and, so far as I have been able to find from an extensive examination of statistics, at other institutes. In the case of those bitten on the head where incubations are short, the differences are not so striking, but in the case of those bitten on the arm and leg, where incubations tend to be prolonged, cases of long incubation appear to have been absolutely excluded. This result is of high statistical significance and demands careful consideration.

During the years 1925–1930 at Bandoeng a series of alternate cases were treated by carbolized virus and by living monkey brain virus. The results for persons arriving for treatment within the first week after the bite are given in Table II.

TABLE II.

Alternate case experiment, 1925–1930.

	Number treated	Deaths		Proportion	Mortalities		
		Total	Incubation <30 days		Total	Incubation <30 days	Incubation >30 days
HEAD C.V.	52	3	3	100	5·20	5·20	0
M.Br.	59	5	5	100	8·50	8·50	0
LIMBS C.V.	718	6	2	33	0·84	0·28	0·56
M.Br.	690	2	2	100	0·29	0·29	0
ALL POSITIONS							
C.V.	770	9	5	55	1·17	0·65	0·52
M.Br.	749	7	7	100	0·93	0·93	0

The frequency distribution of incubation periods for those bitten in all positions is as follows :—

	15 days	16–20 days	21–25 days	26–30 days	31–35 days	36–40 days	41–45 days	Totals
M.Br.	0	1	3	3	0	0	0	7
C.V.	1	3	0	1	2	1	1	9

On the assumption that the distributions are random samples of the same population, differences equal to or greater than those observed would be expected in 1 or 2 cases out of 10.

Again the distributions of intervals between the time of commencing treatment and onset of symptoms are :—

	15 days	16–20 days	21–25 days	26–30 days	31–35 days	Totals
M.Br.	1	2	4	0	0	7
C.V.	2	2	1	2	2	9

and the probability is in this case about 0·4. Thus, although the result of this experiment is in agreement with the Bandoeng experience cited above, viz., that deaths with incubation periods of over 30 days have been excluded by treatment by Monkey Brain virus and are not excluded by carbolized vaccines, yet the numbers used were too small for the test to be crucial and the thesis is not proven. The author, however, interprets the experiment differently. She writes "From these statistics it appears again how little stress may be laid on the results obtained in wounds of the head and face for the evaluation of a method as, in both groups, only cases with short incubation periods occurred. The mortality rate of this category treated with live vaccine

was even higher than in the other group (5/59=8·5 per cent. against 3/52=5·8 per cent.). Notwithstanding the available statistical material being but small, the comparison between the results of treatment of wounds of the limbs may be considered as conclusive. For this category all cases of hydrophobia treated with live vaccine fall within the first month after the bite, against only 2 out of 6 (=33·3 per cent.) of the other group, in which moreover 2 failures were recorded (36 and 43 days after the bite and 33 and 34 days after commencement of treatment). The exactly identical mortality rate within the first month after the bite in both groups gives evidence of their similar concentration, as could be expected from the method of compilation. It is obvious that all cases observed among wounds of the limbs after the first month should have escaped infection [death] if they had all been treated with live vaccine. In that case, the mortality rate of this category would have been reduced to one-third of the actual mortality rate. Though the results of treatment with such a carbolized vaccine probably compare favourably with those by the Pasteur method and perhaps even with the Högyes' method with rabbit brain fixed virus, this experiment has undeniably pointed out that an entire substitution of the live vaccine by this dead vaccine remains out of the question." It is unfortunate that this experiment was not continued. A definite conclusion on an alternate case basis would have been of the greatest value.

The figures of the alternate case experiment may be further examined. In the fifth column of Table II are given the mortalities according to the different positions for the two methods of treatment. It is at once apparent that the total mortalities for the two methods are very similar (1·17 and 0·93 per cent.). The most striking difference in mortality is in the case of those bitten on the limbs (0·84 per cent. for C.V. as compared with 0·29 per cent. with Monkey Brain virus). This difference, however, is not significant (P=0·18). It will also be noticed that the rate 0·29 per cent. for those treated by Monkey Virus in the alternate case experiment is considerably lower than the rate 0·48 per cent. observed at Bandoeng during the period 1916–1932, when Monkey Brain virus was used (see Table I). Again, this difference is not a significant one, but this is in harmony with the statement above that the differences observed during the alternate case test are such as might have occurred as a result of random sampling. It would thus appear that so far as mortality rates are concerned neither the total figures nor those relating to particular positions furnish any definite evidence of superiority of the Monkey Brain virus over carbolized virus.

Thus VAN STOCKUM's conclusion that "since the action of carbolic acid in such a concentration as to ensure an absolutely innocuous vaccine largely deteriorates the antigenic properties of fixed virus, this disinfectant should not be retained for the preparation of dead fixed virus vaccine" cannot be deduced from the facts which she has presented.

On the other hand, as stated above, amongst those treated with C.V. four cases with incubations between 31 and 45 days occurred, whereas with Monkey Brain virus, there were no cases with incubations exceeding 30 days. Although this result is not statistically significant in the alternate case experiment as shown above, it is in conformity with VAN STOCKUM's contention, deduced from her wider experience, that with Monkey Brain virus cases of long incubation are eliminated,

and also with the well-known fact that with C.V. [and so far as I am aware all other methods of antirabic treatment] these cases of long incubation undoubtedly occur.

It remains for the future to show whether with the vaccine employed at Bandoeng the elimination of cases of long incubation will be maintained. In the meantime, the time is clearly ripe for the performance of a crucial test either on animals or on man to elucidate this important point.

The second part of this book is devoted to a study of the etiology and diagnosis of accidents of treatment. The author believes that normal brain substance is absolutely innocuous, and that fixed virus as such is the exclusive cause of accidents. " When treatment with vaccines prepared with virus submitted to heat or to disinfectants with the object of killing, gives rise to accidents, such vaccines are proved still to contain live virus."

The fifth analytical review of reports from Pasteur Institutes prepared from schedules submitted to the Health Section of the League of Nations (McKendrick)[25] deals mainly with statistics relating to the year 1932. The number of persons treated was 115,959, of whom 439 contracted the disease, and 22 suffered from post-vaccinial sequelae. In previous reviews it was pointed out that there was a marked difference in the mortalities of Europeans and non-Europeans, and that in order to obtain figures which were comparable these race types had been treated separately. It now appears as if the European group was in itself heterogeneous. Disturbances in the form of excessive mortalities are appearing, which have their origin in the Balkan Peninsula, and are independent of the method of treatment employed. The figures suggest that, as regards degree of risk, the Balkan group takes an intermediate position between the European and the non-European. A remarkable fact which has emerged is that amongst those bitten on the leg and treated by killed ether vaccines in Yugoslavia no deaths have been reported amongst 18,152 persons treated over the period for which statistics are available. The figures when divided according to race type show a marked similarity in the mortality rates which occur amongst those treated by the different methods. The same statement holds with regard to the statistics of the U.S.S.R. which are separately analysed.

Sáiz Moreno[26] reviews various aspects of rabies epidemiology, and discusses in particular treatment by Semple's modification of Fermi's vaccine. He concludes that it is innocuous, efficacious and easier of application than other vaccines.

v. Rabies in Animals.

A remarkable increase in the incidence of rabies in South Africa, not only in the *Viverridae*, but also in human beings and in domestic animals is reported by Neitz and Thomas.[27] (For previous reports see

[25] McKendrick (A. G.). A Fifth Analytical Review of Reports from Pasteur Institutes on the Results of Anti-Rabies Treatment.—*Quarterly Bull. Health Organisation, League of Nations.* 1934. Dec. Vol. 3. No. 4. pp. 613–653.

[26] Sáiz Moreno (Laureano). Consideraciones acerca de la epidemiología de la rabia y del poder inmunológico de la vacuna semple.—*Rev. Higiene y San. Pecuarias.* 1935. Apr.–May. Vol. 25. No. 4–5. pp. 335–347. [21 refs.]

[27] Neitz (W. O.) & Thomas (A. D.). Rabies in South Africa. Occurrence and Distribution of Cases during 1933.—*Onderstepoort Jl. Vet. Sci.* 1934. Oct. Vol. 3. No. 2. pp. 335–342. With 1 folding map.

this *Bulletin*, Vol. 28, pp. 742–743, Vol. 30, p. 576, and Vol. 31, p. 149.) New outbreaks are reported in the Transvaal and in the Orange Free State.

Bouvier[28] describes cases of rabies amongst dogs in the Congo. These are usually of paralytic type. The number of persons bitten is small, and no fatal human cases have been recorded. Subpassage into guineapigs is usually successful, but in no case have Negri bodies been observed.

vi. Post-Vaccinial Paralyses.

Remlinger,[29] using as his text the reports of 6 cases treated by Pasteur, which Pasteur's opponents claimed to be "rage laboratoire," discusses the means by which death from street virus can be differentiated from death from fixed virus. Of the 6 cases above mentioned he believes that three were ordinary rabies, one a case of uraemia and two are indeterminate from lack of evidence. He believes, in spite of affirmations to the contrary, that it is right to attribute a death to fixed virus, if by animal experiment the latter can be demonstrated to be present in the brain. It is not, however, possible to obtain a clear cut differentiation between fixed virus rabies and certain reinforced strains of street virus, though Negri bodies and other histological appearances may aid. Cases of "rage laboratoire" after dried cord treatment, are only observed if the more virulent cords have been injected too early or in too great quantity—that is to say if the long preparation with doses of inoffensive cords advocated by Pasteur has been neglected. He presses the point that the attenuation of fixed virus for man, ought not to be exaggerated. The large number of passages renders the virus more sensitive to drying and to the action of glycerine, but much less to dilution. This accounts for the greater frequency of "rage laboratoire" amongst persons treated by dilution methods.

A case of paralytic accident presenting the features of the Landry syndrome is described by Marinesco and Façon.[30] Symptoms appeared on the 6th and disappeared after a month. The authors recapitulate the various views regarding the causation of such accidents and conclude that they result from a local diminution of the immunity of the nerve substance due to the cytotoxic action of the heterotype vaccine, and, consequently, from a receptivity for neurotropic viruses which up to that time had been deprived of virulence.

A case of death from an encephalo-myelitis occurring after a course of treatment is described by Marinesco and Draganesco.[31] Treatment was commenced on the 4th day and completed on the 13th. Symptoms of paraplegia of the Landry type appeared on the 13th day

[28] Bouvier (G.). Mukupa : rage canine congolaise ? (Lomani-Kasai).—*Bull. Soc. Path. Exot.* 1934. Nov. 14. Vol. 27. No. 9. pp. 821–825. [12 refs.]

[29] Remlinger (P.). Pasteur et la rage de laboratoire.—*Bull. Acad. Med.* 1935. Jan. 8. 99th Year. 3rd Ser. Vol. 113. No. 1. pp. 13–27. [28 refs.]

[30] Marinesco (G.) & Façon (E.). Contribution à l'étude de la pathogénie et du mécanisme de production des accidents consécutifs au traitement antirabique.—*Bull. Acad. Méd.* 1935. Feb. 5. 99th Year. 3rd Ser. Vol. 113. No. 5. pp. 169–174. [15 refs.]

[31] Marinesco (G.) & Draganesco (State). Recherches anatomo-cliniques et expérimentales sur un cas d'encéphalo-myélite rabique survenue au cours d'un traitement pasteurien.—*Ann. Inst. Pasteur.* 1935. Mar. Vol. 54. No. 3. pp. 299–324. With 10 figs. [11 refs.]

followed by death 6 days later. A full histological description of the brain is given. (No Negri bodies were found.) At the same time rabbit tests were carried out, and in each case paralysis appeared in 4 to 5 days. Possibly this was a reinforced virus.

vii. Miscellaneous.

It may be remembered that Proca, Bobes, and Jonnesco[32] found that antirabic serum was ineffective as a therapeutic agent in the case of mice infected in the tail. This was believed to be due to the richness of the tail in nerve endings (this *Bulletin*, Vol. 31, p. 642). They have repeated the experiment using a finer needle for the introduction of the test dose, and centrifuging the emulsion in place of straining it. In this case the antirabic serum was effective. Of the treated 18 out of 41 succumbed, whilst of the controls 23 out of 32 developed rabies.

Hoyt, Fisk, and Thienes[33] have continued their researches on the effects of various drugs upon the course of rabies infection (this *Bulletin*, Vol. 28, p. 752). They have now examined the effects of plasmoquin merthiolate, metaphen, bismuth violet, iodobismitol, bismarsen, tryparsamide, silver tryparsamide, Bayer 205, ethylhydrocupreine hydrochloride (optochin), pyridium, sodium arsanilate (atoxyl), neostam and sparteine sulphate. "The mean period of incubation and mean length of life (after injection of fixed virus) were calculated for each group. Neither of these periods differed significantly as between the treated and control groups of mice included in any one series of experiments." Thus they conclude that "no evidence was shown that any drugs employed under the experimental conditions described here had any effect whatsoever on the course of rabies produced by injection of fixed virus in white mice."

Remlinger and Bailly[34] discuss the decentralization of antirabic treatment. They consider it to be an important line of progress. "In this progress, the mother country of Pasteur ought to do what she can, as already other countries have done, for the profit of the nations."

Manouélian[35] has turned his attention to Borna's disease. Just as in the case of rabies, the inclusion bodies of Borna's disease (the bodies of Joest Degen) are found in the neurones of the central nervous system, and in those of the salivary glands, the pancreas, the suprarenals, etc. They are also present in the intra-glandular and intramuscular nerve cells of the tongue and in the neurones of its mucosa.

A. G. McKendrick.

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[32] Proca (G.), Bobes (S.) & Jonnesco (D.). Sérovaccination et sérothérapie de la rage chez la souris.—*C. R. Soc. Biol.* 1935. Vol. 118. No. 7. pp. 729–732.

[33] Hoyt (Anson) Fisk (Roy T.) & Thienes (Clinton H.). Experimental Rabies in White Mice and Attempted Chemotherapy, II.—*Jl. Infect. Dis.* 1935. Jan.–Feb. Vol. 56. No. 1. pp. 21–27. With 1 chart.

[34] Remlinger (P.) & Bailly (J.). La décentralisation de la vaccination antirabique.—*Bull. Acad. Méd.* 1935. May 7. 99th Year. 3rd Ser. Vol. 113. No. 17. pp. 579–583.

[35] Manouélian (Yervante). Rage, maladie de Borna et neurones périphériques.—*C. R. Acad. Sci.* 1935. Mar. 4. Vol. 200. No. 10. pp. 862–863.

HELMINTHIASIS.

Yao (Y. T.), Hsu (S. C.) & Ling (S. C.). **On the Occurrence of Intestinal Parasites in Man in Different Combinations. (A Statistical Study of the Results of 9,853 Fecal Examinations.)**—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 2. pp. 531–538.

——, —— & ——. **Intestinal Parasite Infestation of Primary School Children in Nanking. (A Record of Survey from April 1932 to April 1933.)**—*Ibid.* pp. 539–549. [27 refs.]

—— & Chu (H. J.). **Intestinal Parasites among the People under Suburban Conditions in Tangshan, Nanking.**—*Ibid.* pp. 551–553.

Yu (T. H.), Chu (P. J.), Wang (C.) & Tao (C. S.). **The Prevalence of Intestinal Parasitic Infection among School Pupils in Shanghai.** —*Ibid.* pp. 555–556.

Examination was by 6 smears (3 made with saline solution and 3 stained with iodine-eosin solution) for 2,877 faecal examinations reported on in the second paper, and presumably the same technique was used for the first.

The figures are statistically considered and incidence is of local value. It is particularly noted that little correlation was found between degree of intestinal infection and the child's physical and mental development.

The incidence of infection in 1,365 "school children" between 6 and 20 years of age was investigated. Figures of results are not given. *Fasciolopsis buskii* was present. Tangshan lies 20 miles east of Shanghai.

"Faecal examination" of 1,412 school children at Shanghai showed 48·4 per cent. with parasites, namely *A. lumbricoides* 35·9, *T. trichiura* 22·8, *F. buskii* 1·6, *A. duodenale* 0·6, *C. sinensis* 0·3. *Clayton Lane.*

i. Vogel (H.), Wu (K.) & Watt (J. Y. C.). **Preliminary Report on the Life History of Paragonimus in China.**—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 509–517. With 5 figs. on 2 plates.

ii. Loucks (H. H.). **Hydatid Disease in China.**—*Ibid.* pp. 567–571. With 3 figs. on 2 plates.

iii. Ku (D. Y.) & Kao (Z. M.). **Some Histological Observations on Filariasis Bancrofti.**—*Ibid.* pp. 573–585. With 10 figs. on 5 plates. [12 refs.]

iv. Minamizaki (Yushichi). **A Study of the Viability of Hookworms in the Intestine.**—*Ibid.* pp. 587–588.

v. Yoshida (Sadao). **Contribution to the Study on *Gnathostoma spinigerum* Owen 1836, Cause of Esophageal Tumor in the Japanese Mink, with Especial Reference to its Life History.**—*Ibid.* pp. 625–630. With 15 figs. on 6 plates.

i. Vogel, Wu and Watt have found encysted metacercariae of paragonimus in *Potamon denticulatus*, apparently the first time they have been seen in this host in China. The infection rate of these crabs varied in 8 infected villages from 4·6 to 27 per cent. The method of eating these is to put them for a few hours in a pot of rice-wine, salt and anise-like spice in which they rapidly die. The soft parts, especially from the legs, are sucked out, and it is in the legs that a

high percentage of cysts has been found. Work is being undertaken to determine how long the cysts survive within crabs lying in this sauce. [See also KHAW below, p. 629].

ii. Loucks reports 3 more cases of hydatid from the Peiping Hospital.

iii. Ku and Kao report on the histology of material from 5 filarial cases. The tissue changes are such as are in fact common, but the writers are evidently unfamiliar with the appearance of the adult worms when seen in tissue sections, and the reproduced photo (Fig. 10) does not permit of the certain identification of what they believed to be a young worm.

iv. Minamizaki by self-infection through the skin put the life-span of " hookworms " as about 7 years.

v. Yoshida reports that 47 per cent. of 5,253 Japanese mink examined were infected with gnathostomes, the lesion being in the lower end of the oesophagus. The eggs when freshly passed are not embryonated, as in fact they were in the preserved material examined by BAYLIS and LANE. The work of PROMMAS and DAENGSVANG (this *Bulletin*, Vol. 30, p. 711) is confirmed, namely that development to the stage of armed head-bulb with 4 cervical sacs and alimentary canal occurs in cyclops. The further course is being investigated.

Ten other helminthological papers presented to the Congress are noted under titles only on pp. 674–675. *C. L.*

GUY (R.). Parasitisme intestinal à Luang-prabang (Haut-Laos). [**Intestinal Parasites in Upper Laos.**]—*Bull. Soc. Méd.-Chirurg. Indochine.* 1934. Dec. Vol. 12. No. 10. pp. 934–939.

Faecal smears gave the following percentages of infection for school children, military and police respectively.

Hookworms 44, 52·9, 52 ; trichuris 88, 62·3, 54·8 ; ascaris 92, 38·8, 52. The prevalence of malaria caused blood examinations for anaemia to bear little relation to helminthic disease. *C. L.*

i. CHEN (H. T.). **Helminths of Dogs in Canton, with a List of those occurring in China.**—Reprinted from *Lingnan Sci. Jl.* Canton. 1934. Jan. Vol. 13. No. 1. pp. 75–87. With 1 fig. & 1 plate. [15 refs.]

ii. ——. **Helminths of Cats in Fukien and Kwangtung Provinces with a List of those recorded from China.**—*Ibid.* Apr. No. 2. pp. 261–273. [20 refs.]

i. Of the parasites found in 54 dogs, mostly from Canton, the percentages of those directly or indirectly of human interest were : *Clonorchis sinensis* 44·2, *Metagonimus yokogawai* 3·8, *Echinostomum ilocanum* 13·5, *Paragonimus* sp. 1, *Dirofilaria immitis* 13·7, *Dipylidium caninum* 77, and *Diphyllobothrium mansoni* 7·7. The percentage infected with *C. sinensis* is a notable one.

ii. Similarly the finds in 57 Canton cats were : *C. sinensis* 80, *M. yokogawai* 3·51, *D. caninum* 38·6, *D. mansoni* 28·07, sparganum probably of *D. mansoni* 1·75, *Ancylostoma braziliense* 36·84, *D. immitis* 3·51, a strongyloides 1·75. In 32 Foochow cats the corresponding figures were 59·37, 0, 62·5, 15·63, 0, 0, 0, and 0. Again the clonorchis infections were many. *C. L.*

HILMY (I. S.). **The Microscopic Examination of Faeces for Helminthic Infection.**—*Jl. Egyptian Med. Assoc.* 1935. Jan. Vol. 18. No. 1. pp. 39–47. [19 refs.]

Various diagnostic methods for detection of helminthic eggs are described; two are compared by the positives they display. These last are Khalil's gravity floatation in an Erlenmeyer flask, which it is reported is in use in all hospitals in Egypt for the mass diagnosis of hookworm infection, and D.C.F., which is wrongly described as an adhesion method [for it is the non-adhesion which it produces that enables its essential herding to be accomplished].

"The following unpublished figures are given with the kind permission of Professor Khalil Bey. They are the result of the examination of 521 cases by this and Khalil Bey's method.

210	were positive	by	Lane's, or 40·31 per cent.;
195	,,	,,	Khalil Bey's, or 37·43 per cent.;
32	,,	,,	Lane's, but negative by Khalil Bey's; and
15	,,	,,	Khalil Bey's and negative by Lane's.

From the above it is seen that Lane's method gives about 3 per cent. more positives, but it entails the use of an entirely new apparatus."

[This method of comparison is unscientific. The smear will detect every infection if sufficiently heavy.] *C. L.*

EMARA. **Toxicity of Carbon Tetrachloride.**—*Jl. Egyptian Med. Assoc.* 1935. Jan. Vol. 18. No. 1. pp. 3–14. With 6 figs.

SHAFY MOH (Abdel). **Note on Pathological Findings on a Case of Carbon Tetrachloride Poisoning.**—*Ibid.* pp. 15–16.

The symptoms and lesions in a case of fatal poisoning with carbon tetrachloride are described.

A girl of 12 was given 2 cc. of carbon tetrachloride and a purge and enema, and died in 48 hours with vomiting, diarrhoea, jaundice, coma, extensive central necrosis of the liver and advanced cloudy swelling and fatty change in the tubular epithelium of the kidneys. The bowel contents were free from the drug. A second case of Professor DAY's is reported in a man of 55 who died collapsed, 29 hours after taking carbon tetrachloride, the bowels having been well opened; the liver showed multiple foci of necrosis 5 to 30 mm. in diameter. The causes contributing to poisoning are discussed. *C. L.*

HASSAN (A.) & SALAH (M.). **Investigation on Carbon Tetrachloride Intoxication.**—*Jl. Egyptian Med. Assoc.* 1935. Apr. Vol. 18. No. 4. pp. 207–213.

A survey of literature with report on certain experiments.

No cases of poisoning by the drug have in fact occurred in the hospital of the Research Institute, Cairo. The ill effects which occur with ascaris infection were investigated by shaking for 4 hours bits of fresh ascaris from man in carbon tetrachloride in the proportion of 7 to 5. Administration of 5 cc. per kilo of the extract to dogs caused no ill effects, nor did similar quantities of an extract of dried worms. As commonly reported liver function tests were almost or actually negative. The authors' investigations leave them unprepared to agree at the moment that calcium deficiency is an important predisposing factor in poisoning; but during discussion Salah did not

deny the antagonism of tetrachloride and calcium, but held that the success of calcium therapy did not necessarily indicate a previous calcium deficiency. Toxic symptoms occurring within 24 hours of administration appeared to be due to depressed cerebral action and should be treated by enemata, and respiratory and heart stimulants (caffeine and adrenalin). In discussion Professor KHALIL reported that the exact number of cases of " carbon tetrachloride poisoning " was unknown but 7 or 8 were reported yearly by the Parquet.

C. L.

TEICHLER (G.). Ueber die anthelminthische Wirkung der Wurzelrinde von *Vangueria edulis*. [**Anthelmintic Action of Root Bark of** *V. edulis*.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1935. May. Vol. 39. No. 5. pp. 211–213.

A decoction of the rind of the root of *Vangueria edulis* was tested against certain intestinal worms.

Edulin, as the decoction is named, was tested in 100 cases against ascaris. It produced passage of worms but the details given do not permit of proper assessment of its value. Threadworms were passed in numbers. In the four cases of hookworm and one of taenia infection in which it was tested there was failure. *C. L.*

RATNAGIRISWARAN (Arayapuram Natesa), SEHRA (Kumar Banu) & VENKATARAMAN (Krishnasami). **The Anthelminthic Constituent of the Leaves of** *Calycopteris floribunda*.—*Biochem. Jl.* 1934. Vol. 28. No. 6. pp. 1964–1967.

Calycopteris floribunda (N.O. Combretaceae) grows in Madras, where the young leaves are reputed to have anthelmintic properties. Calycopterin is found to be toxic to round worms. Summary :—

" 1. The anthelminthic constituent, *calycopterin*, of the leaves of *Calycopteris floribunda* has been isolated.

" 2. Calycopterin is shown to be a dihydroxytetramethoxyflavone, which yields *p*-hydroxybenzoic acid on fusion with alkali.

" 3. Demethylation of calycopterin gives a new hexahydroxyflavone, *calycopteretin*." *C. L.*

AZIM (M. Abdel). **The Epidemiology and Endemiology of Schistosomiasis in Egypt.**—*Jl. Egyptian Med. Assoc.* 1935. Apr. Vol. 18. No. 4. pp. 215–226. With 1 fig.

Observations on the distribution and bionomics of bilharzia carriers in Egypt.

In Egypt *Bulinus contortus, B. dybowskii* and *B. innesi* live at the bottom of main streams and canals with running water clinging to weeds, for they need much oxygen. *Planorbis* snails are absent from the Nile and big canals and prefer slow moving or stagnant and muddy water. In discussion KHALIL reported thus :—

" Bulinus snails have been caused to change from one species to another and to give rise to intermediate species by cross breeding. So, they are not fixed species. In Egypt, we find certain species of Bulinus prevailing in certain districts ; for example, in the oasis only *Bulinus dybowskii* exists. In Helwan the same species is in great preponderance. From Khartoum to Cairo only Bulinus snails exist, while north and south of this zone, both Bulinus and Planorbis are found. In the Blue Nile, where

the water is very soft, only Bulinus snails are present, whereas in the White Nile, where the water has a higher salt content, Planorbis is found. It is claimed that the distribution of the various snails is governed by the rapidity of the stream. The pointed snails can withstand the most rapid streams. They can be arranged, according to their resistance, in the following order. *Physa, B. innesi, B. dybowskii, B. contortus,* and *Planorbis.* This can be seen in the river Nabi Robin in Palestine where the water is running very swiftly, yet there are Bulinus snails and *Schistosoma haematobium.*"

HILMY reported thus :—

"I have been trying to infect Planorbis snails experimentally with *Schistosoma haematobium* miracidia. Up to now the development has reached the sporocyst stage in the livers of the snails and I am hoping to obtain the complete development to the cercaria stage." *C. L.*

VIGLIETTA (Carlo). Osservazioni e ricerche sulla schistosomiasi vescicale dei bambini. [**Urinary Schistosomiasis in Children in Derna (Cyrenaica).**]—*Pediatria.* 1935. Jan. 1. Vol. 43. No. 1. pp. 54–66. [32 refs.] English summary (4 lines).

The author examined 606 children attending the local elementary schools and found 9 of them (1·5 per cent.) with urinary schistosomiasis. Their ages varied between 8 and 13 years. Only one was accustomed to bathe in the Wady, all the others bathed in the irrigation canals. *Bulinus contortus* was common. Of the 9 six presented typical symptoms, one suffered much pain, the other two had never noticed anything unusual or any discoloration of the urine, and blood was found only by microscopical examination. The author strikes a note of warning lest the introduction of these children into Italy should lead to diffusion there. *H. H. S.*

BERGEROT (Jean). Le foyer de bilharziose de Djanet, Pays Ajjer (Sahara Algérien). [**Focus of Schistosomiasis at Djanet, Algerian Sahara.**]—*Arch. Inst. Pasteur d'Algérie.* 1935. Mar. Vol. 13. No. 1. pp. 47–67. With 8 figs. on 4 plates. [10 refs.]

The oasis of Djanet is described as the only focus of schistosomiasis in Algeria. Djanet lies close to the frontier of Tripoli at 24°N. The focus has been known since 1923, and infection is by *S. haematobium,* to the extent of 27 per cent., invasion being accompanied by skin rashes. The snails have been identified as *Bulinus contortus, B. dybowskii, B. brochii,* and *B. innesi.* The sterilization of pools by copper sulphate is rendered difficult by the springs which feed them, and will require much perseverance. *C. L.*

CAWSTON (F. Gordon). **Artificial Sources of Schistosome Infection and the Cure of Patients.**—*Jl. Trop. Med. & Hyg.* 1935. May 1. Vol. 38. No. 9. pp. 105–106.

Infective *Physopsis africana* can be excluded from a garden by running the entering water through $\frac{1}{8}$ in. mesh ; eggs pass through, but provided the water in the garden is not subsequently infected the adult snails are harmless. That neighbouring pools may have or may not have snails in them shows that birds have little influence in spreading these. The disuse of potassium antimonium tartrate in treatment is again lamented. *C. L.*

LUTROT (M.). Note sur deux foyers malgaches de bilharziose vésicale à *Schistosomum haematobium.* [**Two Madagascar Foci of Urinary Schistosomiasis.**]—*Bull. Soc. Path. Exot.* 1935. Mar. 13. Vol. 28. No. 3. pp. 243–245.

S. haematobium has been found in indigenous persons, it is stated for the first time, in two spots in Madagascar, Tsianipiha and Anjijobe.

C. L.

KHALIL Bey (M.). **Chemotherapy of Schistosomiasis.**—*Jl. Egyptian Med. Assoc.* 1935. Apr. Vol. 18. No. 4. pp. 284–294.

A useful survey of aspects of the antimonial treatment of schistosomiasis.

Potassium antimonium tartrate has these disadvantages. Local thrombosis, rare even with the concentrated solution used in Egypt; opacity with greatly increased toxicity if boiled till opalescent—probably the oxide is formed; increased toxicity unless freshly prepared—perhaps from the formation of isomers; local inflammation in 5 per cent. of cases—probably from escape of fluid into the tissues; cough in 10 per cent. of cases; nausea and vomiting in 38·8; fever; muscular pains in later stages of treatment. Complications are herpes and dermatitis. Contraindications are put as nephritis, heart failure and fever. Twelve injections were given on alternate days, and continued if a cure was not attained. Cure percentages in 1,000 consecutive cases completing the course were 89·4 in all; after 12 injections 68·3; after 13, a further 10·3; after 14 to 17, a further 10·8. Half the treated did not complete the course.

Sodium antimonium tartrate is less stable than the potassium salt. As to fouadin cases treated may be summarized thus :—

Year	No. of cases	Percentage cured after			Percentage relapsed after 1 month
		9 injections	11 injections	13 injections	
1931	3,288	52·26	15·69	3·31	0·71
1932	2,299	62·20	20·50	4·10	9·30
1933	3,302	63·41	15·23	4·38	12·92

Complications and sequelae are not given in comparable figures. Bradycardia is frequent but unexplained. In 1933, fever occurred in 36 cases and was due to typhoid in 6, pyelitis in 7, malaria in 4, abscess in 1, unexplained 18; oedema in 3; herpes zoster in 4; exacerbation of pellagrous erythema repeatedly; vomiting in 0·36 per cent.; abscess twice in 2,000 cases or 20,000 injections; sudden death once in 2,041 cases. There are also considered the effects of fouadin on the liver, its excretion mainly by the kidney, its injection daily which gave toxic symptoms in half the cases, its use in large doses, and the use of fouadin calcium. The ideal drug will cure in one injection or will be capable of oral administration. In discussion SALAH pointed out the lessened efficiency of fouadin during the last 3 years. *C. L.*

FAUST (Ernest Carroll), JONES (Charles A.) & HOFFMAN (William A.). **Studies on Schistosomiasis Mansoni in Puerto Rico. III. Biological Studies. 2. The Mammalian Phase of the Life Cycle.**—*Puerto Rico Jl. of Public Health & Trop. Med.* 1934. Dec. Vol. 10. No. 2. pp. 133–196. With 3 text figs., 7 charts & 9 figs. on 4 plates. [32 refs.] [Spanish version pp. 197–254.]

For the first time the growth of the worm in the definitive host has been traced in rat, rabbit and monkey from entry of the cercaria to oviposition by the female. Tissue changes in relation to habitat have been described.

Cercariae emitted before 2 p.m. from several *Australorbis glabratus* were pooled to make certain of their being of both sexes. The hosts were examined very thoroughly. Though cercariae are described as being equally distributed through the water, the parts attacked as evidenced by irritation are those at or above the surface level of those wading in water [which suggests pushing against the residual water film as a help in effecting penetration and falls in with the authors' belief that the greater the effort to dislodge the "inoculum" the wider will it be spread]. Penetration is presumably aided by the gland secretions since the glands are almost empty when the larvae are in the dermis. Migration was almost wholly by the blood stream first to the lungs and then to the liver. It is believed from observations every few hours that feeding on blood begins in the liver and that if metacercariae are found with blood in them in the heart or lungs they have been in the liver and been washed out of it back to the lungs. The various stages of growth are labelled with the letters of the Greek alphabet from alpha to omega but in the Summary and Conclusions the sixth letter of the alphabet is spoken of as if it were the fourteenth, the resulting confusion being an added reason for accepting the fact that Greek is learnt by few scientists nowadays and for using only the four stages also mentioned, metacercarial, juvenile, adolescent and adult. From the liver the immature worms go to the mesenteric veins (in the rat about the 23rd day) and make for the veins about the ileo-caecal junction; others crowded out of these spread through the mesenteric, the haemorrhoidal and vesical veins. Mating takes place in these veins, the 47th day being noted as showing worms in copula and eggs in the tissues. Up to the 9th month at least worms in the mesenteric vessels outnumbered those in the liver by 5 to 1 in these overcrowding infections. In these hosts worms in copula were rare. Usually there was 1 egg in the uterus and it is estimated that 100 or more are laid daily, it being held that few per cent. leave the body.

"Increases in young neutrophilic leukocytes (*i.e.*, stab forms, juveniles and myelocytes) were registered (1) during the period of invasion of the larvae through the skin, (2) at the time of their maximum accumulation in the lungs, and (3) with the initiation of oviposition by the mature female worms. These increases were relative and were never accompanied by an absolute leukocytosis.

"There was no local reaction at the sites where the larvae entered the skin. On the other hand, during the passage of the metacercariae through the lungs, and, later, around the sites where eggs were infiltrated into the liver and the intestinal wall, there was first an intense response on the part of the neutrophilic leukocytes, which were replaced by successive invasions of eosinophiles, plasma cells and fibroblasts. Generalized eosinophilia developed in some of the animals toward the end of the prepatent period

and at the beginning of the patent period. Its complete absence in one monkey is to be regarded as a lack of defensive response to the disease, which caused the death of the animal on the 55th day. In general, with the progress of the infection a relative peripheral lymphocytosis developed.

" The degree of anemia in both the experimental and clinical cases was dependent primarily on the severity of the infection rather than on the duration of the disease.

" Only one of the experimental hosts had a positive Sia euglobulin reaction. This did not appear until some days after a significant eosinophilia had been registered. On the other hand, 8 of the 11 human cases examined had a positive euglobulin reaction, but there was no evidence of correlation between the intensity of the euglobulin reaction in the blood and the degree of eosinophilia.

" The hematopoietic response in experimental and human infections of schistosomiasis mansoni is similar to that of other helminthiases, in which an early acute reaction is followed by gradual adjustment of the host tissues to the invading organism." *C. L.*

DE BÈVE (F.). La bilharziose en Ruanda-Urundi et spécialement à Usumbura. [**Schistosomiasis in Ruanda-Urundi.**]—*Ann. Soc. Belge de Méd. Trop.* 1935. Mar. 31. Vol. 15. No. 1. pp. 3–18. With 3 figs.

A study of Mansonian schistosomiasis at Usumbura, the capital of Ruanda-Urundi.

This town lies near the equator on the north-east shore of Lake Tanganyika, which has an altitude of about 2,500 feet. Swampy ground lies beside it, containing many Planorbis and worked over by fishermen of whom over 50 per cent. are infected with *S. mansoni*. The Planorbis emit by day cercariae of human type. Of 120 fishermen examined by means of 2 faecal smears the percentages of infection found were : hookworms 72·2, *S. mansoni* 53·2, trichuris 27·5, ascaris 23·3, strongyloides 22·5, tapeworms 6·7, Giardia 0·8. All were infected by some parasite. In 120 urines no blood, albumin or schistosome eggs were found. Symptoms and physical signs, and the pathological anatomy of an excised rectum are described. Treatment was by tartar emetic and emetine. Prophylaxis is discussed. *C. L.*

HULSHOFF (A. A.). **An Extraordinary Case of Schistosomosis mansoni.** —*Acta Leidensia* (*Scholae Med. Tropicae*). 1933. Vol. 8. pp. 231–241.

This is reported as the second case of chylothorax caused by schistosomiasis.

The man, a native of Djibouti, was found at Rotterdam to have in the faeces many eggs of *S. mansoni*, oedema of legs and back, ascites, fluid in the left pleura, albuminuria with casts, hyaline granular and waxy. On puncture of the left pleura a chylous fluid escaped. This had to be repeated a number of times and the abdomen had to be tapped several times. He died and the autopsy is held to have disclosed " lymphogenic tuberculosis." Under the pleura lay very many shining white spots, which under the microscope displayed no schistosome eggs but were believed to be tubercles with caseation. Similar spots were seen in liver and spleen. Schistosomes were present in mesenteric veins. [Examination of the night blood is not mentioned.]

C. L.

Levine (Jacob) & Marin (Rafael A.). **Carcinoma and Schistosomiasis of the Appendix. A Case Report.**—*Jl. Lab. & Clin. Med.* 1935. Mar. Vol. 20. No. 6. pp. 602–605. With 3 figs.

A carcinomatous appendix was removed from a Porto Rican woman of 28. It contained encapsuled schistosome eggs in that part only which was carcinomatous. *C. L.*

Cawston (F. G.). **Climatic Changes and their Effect on Fresh-Water Molluscs.**—Reprinted from *Trans. Roy. Soc. South Africa.* 1934. Vol. 22. Pt. 1. pp. 81–82.

The author finds that the prolonged drought in the Union of S. Africa of the last few years has been detrimental to the breeding of pond snails such as *Physopsis africana* Krauss, *Bulinus tropicus* Krauss, *Lymnaea natalensis* Krauss, and that the increase of marsh land in the mountainous districts consequent on shortage of rainfall has favoured the smaller species such as *Lymnaea truncatula* Müller, a carrier of Fasciola. He notes also that the anti-malarial treatment of collections of water near the coast with chemicals has destroyed much of the vegetation on which pond snails breed. *A. G. B.*

Andrews (Mary N.). **The Examination of Faeces for the Ova of *Schistosoma japonicum*.**—*Chinese Med. Jl.* 1935. Jan. Vol. 49. No. 1. pp. 42–46.

For diagnosis of infection with *S. japonicum* the hatching out of miracidia by the method of Faust and Meleney was found to be the best.

Stools of 76 cases were positive to Faust and Meleney's method. Of them 29 were positive to the smear and 22 more to sedimentation [Tomb and Helmy, this *Bulletin*, Vol. 29, p. 410]. The method of Faust and Meleney does not seem to have been described in this *Bulletin*. Briefly it consists of repeated sieving, washing and gravity precipitation of the whole stool, until the supernatant fluid is quite clear. It is stood all night in a conical Ehrlenmeyer flask and is then examined with a hand lens for miracidia. These of course congregate near the top and the small surface of the neck of the conical flask produces further concentration. *C. L.*

Saito (Minami). **Wild Rats in Reference to the Prevention of Schistosomiasis.**—*Jl. Public Health Assoc. Japan.* 1935. Mar. Vol. 11. No. 3. pp. 1–5.

Wild rats in the Kofu valley are heavily infected with *S. japonicum* in villages where liming for the destruction of *Oncomelania nosophora* has not been carried on, and but lightly infected in those where this measure has been used.

In non-limed areas the infection rate of 792 rats caught in winter was 19·17 and of 316 caught in summer was 76·89. In limed areas the winter rate among 228 rats was 2·19, and the summer rate among 90 was 1·11. In winter the rates for man and rat were close to one another, in summer those for the rat were the higher. The average length of male worms in the rat was 1·48 cm. and of females 1·79. Though many eggs in the rat's faeces were degenerate, miracidia from

the others developed in the snail " into the sporocyst and then to the redia." The infection rate according to rat species is given as follows :—

" In the cold season it was 17·94 per cent. for *Microtus montebelli*, 16·77 per cent. for *Apodemus speciosus*, 4·44 per cent. for *Rattus norvegicus*, and 1·54 per cent. for *Mus molossinus*, whilst in summer months it was 64·78 per cent. for *Microtus montebelli*, 58·06 per cent. for *Apodemus speciosus speciosus*, and as for *Rattus norvegicus*, none of the 9 rats caught in the intensely infected area was found infected." *C. L.*

Li (T. Y.) & Thompson (H. Gordon). **Treatment of Schistosomiasis Japonica with Antimony Compounds. Review of Literature on Chinese Cases : Report of 15 Cases.**—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 2. pp. 325–344. [44 refs.]

The paper's scope is shown in the subtitle.

" In establishing criteria of cure in schistosomiasis therefore, we should, for the present, consider all the 4 points together :—

" (1) Permanent absence of ova from the stools for at least 2 years.

" (2) Return to normal of eosinophile percentage after other helminths are cleared out.

" (3) Positive Fairley's test becoming negative.

" (4) General improvement of health with disappearance of pre-existing symptoms such as : abdominal pain, epigastric discomfort, and dysentery."

" In the matter of treatment, it appears to us that although P.A.T. is a drug which requires a great deal of care in its use, yet properly used it is still the most efficacious remedy for schistosomiasis japonica."

C. L.

Kourí (Pedro), Basnuevo (José G.) & Fermoselle Bacardí (Joaquín). Poder fasciolicida del clorhidrato de emetina. [**Emetine Hydrochloride in Fasciola Infestation.**]—*Medicina Países Cálidos.* Madrid. 1935. Mar. Vol. 8. No. 3. pp. 145–146.

The authors are fully convinced of the power of emetine hydrochloride to destroy *Fasciola hepatica*. The average dose to attain this end they find is 3·72 mgm. per kilo body weight.

They mention the case of a woman of 38 years, weighing 43 kilos, who was cured by 16 cgm. and believe that smaller amounts would probably suffice. For an adult of 70 kilos 80 cgm. would be a toxic dose or 11·4 mgm. per kilo, so that the therapeutic coefficient would be about 0·3. Taking the average dose mentioned, a man of 70 kilos would need 260·4 mgm. to effect a cure, which is less than a third of the toxic dose, 800 mgm. *H. H. S.*

Kourí (Pedro), Basnuevo (José G.) & Arenas (Rogelio). Un nouvel emploi d'emetine en parasitologie.—*Crónica Med.-Quirúrg. Habana.* 1934. Oct. Vol. 60. No. 10. pp. 427–430.

——, —— & ——. [In Spanish & English.] Una nueva aplicacion de la emetina en parasitologia. **A New Use of " Emetin " in Parasitology.**—*Archivos Med. Infantil.* 1935. Jan.–Feb.–Mar. Vol. 4. No. 1. In Spanish pp. 21–23. In English pp. 24–26.

Six cases are cited in which emetine cured infection with *Fasciola hepatica*. *C. L.*

KHAW (O. K.). *In Vitro* **Experiments on the Viability and Excystment of Paragonimus Cyst.**—*Proc. Soc. Experim. Biol. & Med.* 1935. Apr. Vol. 32. No. 7. pp. 1003–1005.

The length of life of Paragonimus cysts outside any host and the physical conditions which make for excystment are detailed.

"These experiments demonstrate that in a diluted millet wine containing 10 per cent. alcohol and in rice wine (14 per cent. alcohol), the encysted metacercariae were viable up to 43 and 18 hours at room temperature (22°C.), respectively, and that they could be kept alive in the ice chest (10°C.) in 10 per cent. commercial formalin or in 0·9 per cent. saline for over 3 weeks. Therefore, the customary mode of preparing crabs, as practised by the villagers in the endemic area where the infection rate for crabs varies from 25 to 100 per cent., by soaking them, very often only over night at room temperature so as not to spoil the taste, in a weak solution of salt and yellow rice wine seasoned with spices, cannot kill all the cysts of Paragonimus. This would account for the high rate of infection, 87 per cent. in one village, prevailing in the Lan Ting district."

Artificial gastric juice did not help excystment, which occurred in 3¾ hours after this was replaced by artificial intestinal juice; it took place in 1¾ hours in intestinal juice with bile, in 45 to 90 minutes without bile, in 75 minutes in 12 per cent. bile. There was no excystment in 0·2 per cent. sodium carbonate nor in boiled bile or artificial intestinal juice. *C. L.*

RAO (M. Anant Narayan). **Lung Flukes in Two Dogs in the Madras Presidency.**—*Indian Jl. Vet. Sci. & Animal Husbandry.* 1935. Mar. Vol. 5. Pt. 1. pp. 30–32. With 3 figs. on 1 plate.

The author reports lung flukes identified as *Paragonimus westermanii* from a dog in Malabar on the west coast of the Madras Presidency, another from adjoining Coimbatore, and a third from a panther shot at Coorg adjoining Malabar. *C. L.*

CHEN (H. T.). **A Preliminary Note on the Life History of Paragonimus in China.**—Reprinted from *Lingnan Sci. Jl.* Canton. 1935. Jan. Vol. 14. No. 1. pp. 143–144. With 4 figs.

A preliminary report. A figured but unidentified snail and crab are believed for unstated reasons to be the larval hosts of paragonimus in China. *C. L.*

WAGNER (Oskar). Hautallergie und Komplementbindungsreaktion bei Trematodeninfektionen. **Skin Allergy and Complement Fixation in Trematode Infections.**—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1935. Feb. 14. Vol. 84. No. 2 3. pp. 225–236. [11 refs.]

A combination of complement fixation and skin reaction was positive in 90 per cent. of cases of infection with *Fasciola hepatica* in sheep, using as antigen an extract of this fluke. Complement fixation with this extract was also positive with *Dicrocoelium*. *C. L.*

Otto (I. H.) & Tschan Tsching Ji. Ueber die Behandlung der menschlichen Infektion mit *Clonorchis sinensis* (Kobbold) mit Goldeinspritzungen. (Vorläufige Mitteilung.) [**Treatment of Clonorchis Infection in Man with Gold Injections.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1935. Mar. Vol. 39. No. 3. pp. 99–106. With 1 fig. [31 refs.]

Gold injections were effective against *C. sinensis*. Two substances were used, Solganal B oil and auroprotasin. They were apparently always injected intravenously.

Solganal B oil was given to 26 patients. The initial dose seems to have been 0·01 cc. but to have been increased to a varying extent. Thus two who had 11 injections each received in all 0·8126 and 2·57 cc. respectively. Of the 26, the eggs were lost in 16, four are still under treatment and six stopped treatment prematurely. With this treatment and liver extract by mouth an existent urobilinoginuria disappeared and did not return on stopping treatment. Auroprotasin was given to 4 persons ; one broke off treatment after 6 doses totalling 13 cc. and was uncured, the other 3 were cured. Dosage started at 1 cc. rising to 5 cc. with total dosage of 9 to 30 cc. The Takata-Staub-Jezler reaction is positive in severe cases. *C. L.*

Uyeno (Hiroshi). Ueber den Zucker- und Fettstoffwechsel und die passive Anaphylaxie bei experimenteller Kaninchenclonorchiasis. (I. Mitteilung.) Experimentelle Untersuchung ueber den Zuckerstoffwechsel bei der Kaninchenclonorchiasis. [**Sugar Metabolism in Rabbit Clonorchiasis.**]—*Okayama-Igakkai-Zasshi* (*Mitt. d. Med. Gesellsch. z. Okayama*). 1935. Mar. Vol. 47. No. 3. [In Japanese pp. 674–691. [61 refs.] German summary pp. 673–674.]

The author's conclusions on rabbits infected with clonorchis are as follows. In early and light infections the blood is not notably changed. In heavy cases near the end there is marked increase of sugar content, preceded perhaps by a short lessening possibly correlated with the increased icterus and biliary acids in the blood. When glucose, fructose, or galactose is intravenously injected into gravely ill rabbits, high and lasting hyperglycaemia results, accompanied by increased excretion of fructose but lessened excretion of glucose or galactose.

C. L.

Skvortsov (A.). **Studies on the Life Cycle of** *Dicrocoelium lanceatum.* —*Med. Parasit. & Parasitic Dis.* Moscow. 1934. Vol. 3. No. 3. [In Russian pp. 240–253. With 7 figs. [15 refs.] French summary p. 253.]

In the Moscow region Skvortsov investigated the development of *Dicrocoelium dendriticum* in the terrestrial mollusc *Helicella candidula*, and studied the morphology and bionomics of its egg. The shell consists of 4 membranes, the outer three permeable to water and salts, the inner impermeable to these but permitting the passage of organic compounds capable of dissolving fats and lipoids. The eggs remain viable at temperatures between +50°C. and −23°C. for 24 hours and are more resistant to desiccation than the eggs of *Fasciola hepatica*. On leaving the uterus the ovum of *Dicrocoelium* contains a fully

developed miracidium which hatches out in the " crop " of the vector. Thence it penetrates into its " liver," in the follicular connective tissue of which its transformation into sporocysts and cercariae takes place. *C. A. Hoare.*

Dixon (H. B. F.) & Smithers (D. W.). **Epilepsy in Cysticercosis** (*Taenia solium*). **A Study of Seventy-One Cases.**—*Quarterly Jl. Med.* 1934. Oct. N.S. Vol. 3. No. 12. pp. 603–616. With 6 figs. on 3 plates.

Seventy-one cases of epileptic cysticercosis from the Queen Alexandra Military Hospital, Millbank, are described, 38 of them not having hitherto been published.

The frequency of this cause of epilepsy in patients from abroad is again stressed, as also its association with death of the parasite, its diagnosis by X-rays or by palpable cysts, the poor prospect of its treatment, and the lifting from the family of the fear of hereditary epilepsy. *C.L.*

Journal of the Royal Army Medical Corps. 1935. Feb. Vol. 64. No. 2. pp. 92–100. With 6 graphs.—**The Effect of Cooking on the** *Cysticercus cellulosae.*

" With the object of determining whether cooking, as ordinarily practised in the British Army, renders pork infested with the *Cysticercus cellulosae* safe for human consumption, a series of experiments was recently carried out in the Hygiene Department of the Royal Army Medical College."

The temperature reached in ordinary army cooking, with the exception of that of a burst sausage, was 65·5°C. a temperature which all authorities agree to be lethal for *C. cellulosae.* Baking, roasting and frying give the largest margin of safety since 75°C. is reached within the cooking time. Army cooking methods produce well done meat.

C. L.

Martin & Arnaud ; Velu (H.). Epidémiologie de la " maladie hydatique " au Maroc. Première Partie. L'échinococcose humaine [Martin & Arnaud]. Deuxiéme Partie. L'échinococcose du bétail au Maroc [Velu]. [**Epidemiology of Hydatid Disease in Morocco.**]—V. Congr. Ann. Féd. Sci. Méd. Algérie, Tunisie et Maroc (Oran 10–13 avr. 1935). 24 pp. With 1 map.

A statistical study of the incidence of hydatid in Morocco.

Here in the wet zones, where cattle are mostly raised, hydatid infection exists in cattle and sheep ; in the south where there is little rain few cattle are raised. Judging by the presence of fertile cysts, sheep are less dangerous than cattle. In the former calcification is a part of cure, in the latter not so. It is not the number of hosts which is material, for a single dog—or perhaps, it is suggested as a point still needing settling, a single man—can infect many herbivora. The problem of the dog in rural areas is a hard one. *C. L.*

Barnett (Louis). **Formalin in Hydatid Cyst Operations.**—*New Zealand Med. Jl.* 1935. Feb. Vol. 34. No. 179. pp. 1–6. With 2 figs.

The need for the proper use of formolage in operating for hydatid cyst is stressed.

" Dévé and his collaborators have collected from the literature records of 133 cases of operative dissemination, and other noted authorities agree with him in estimating that this disappointing sequela occurs in from 3 to 4 per cent. of cases where formolage has been omitted. I have personal knowledge of at least half-a-dozen wound area recurrences occurring in the practice of colleagues and illustrative specimens can be seen in the Museum of the Otago Medical School."

The method of use of formalin is to expose the cyst and protect, by gauze wrung out in normal saline, the peritoneal cavity and all the wound surface from possible contact with escaping scolices. After evacuation of the cyst fluid by a Potain-type trochar, it is again completely filled with 2 per cent. formalin in water. After 5 minutes the cyst is incised and all parasitic material removed. Absolute contra-indications are cysts in or communicating with the lung and those in brain or cord, and the procedure is impracticable in cysts packed with daughter cysts. *C. L.*

Lemaire & Ribère. Sur la composition chimique du liquide hydatique. [**Chemical Composition of Hydatid Fluid.**]—*C. R. Soc. Biol.* 1935. Vol. 118. No. 15. pp. 1578–1579.

The chemical composition of hydatid fluid has been re-examined. The mean figures are : S.G. 1,011·8 ; residue dried at 100°C. 13·72, ash 8·07, organic matter 5·65, chlorides (as NaCl) 5·96, urea 0·38, calcium 0·088, per litre in each case. Of cholesterol there was no trace in 27 per cent. of fluids, creatinin was constantly present with average of 9·5 mgm. per cent., inosite was present in 81 per cent. of fluids. A proteolytic ferment was always present thus explaining the absence of protein, when it is absent, and the inverse relationship here reported between albumin and amino acids ; it acts best at a pH of 6·7, one which has been found present in hydatid fluid. There is also a glycolytic ferment. That is to say, creatinin, ammoniacal salts and lecithin are normally present in hydatid fluid and the existence of the ferments explains the different quantities of protein and sugar which have been reported. *C. L.*

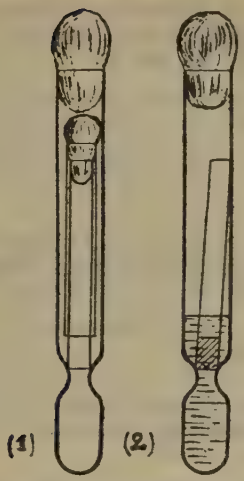
Poisson (H.). Note sur une localisation curieuse du *Cysticercus bovis*. [**Unusual Localization of** *C. bovis.*]—*Bull. Soc. Path. Exot.* 1934. Dec. 12. Vol. 27. No. 10. pp. 956–957.

It is believed that in the calf *C. bovis* may occur in the liver, since a man who had been ordered raw liver passed a headless *Taenia saginata* and denied having eaten raw beef. *C. L.*

Lemaire (G.) & Ribère. Méthode simple et aseptique pour les essais de culture *in vitro* des scolex, applicable à l'étude des phénomènes biologiques susceptibles d'être observés de part et d'autre d'un ultra-filtre. [**Culture of Scolices in Vitro.**]—*C. R. Soc. Biol.* 1935. Vol. 118. No. 11. pp. 1080–1082. With 1 fig.

A method for keeping scolex-containing hydatid fluid sterile, and observing biological reactions.

As the figure shows there are 3 tubes originally sterilized. The outer is a Buchner tube which when sterile is filled to 2 or 3 cm. above the narrowing by serum, natural or artificial. The inner is of a diameter which will not pass the constriction in the Buchner's tube, and is



Culture of scolices in *vitro*.
(1) Apparatus used. (2) In operation.
[Reproduced from the *Comptes Rendus de la Société de Biologie*.]

provided before use with an ultrafilter made by dipping its end into collodion solution and withdrawing it vertically so that a pellicle of collodion stretches across it and dries; if this is perfect, the ascent within the tube of the surrounding fluid is slow and in it are placed the sterile scolices, obtained with care for the maintenance of sterility. The middle tube is merely used to lift the inner one more readily in sterile conditions, the two being kept together by a tampon of cotton wool.

C. L.

Sievers (Olof). Serologische Untersuchungen ueber Bandwurmantigene und ihre Antikörper. [**Serological Investigations of Tapeworm Antigens and Antibodies.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1935. Feb. 14. Vol. 84. No. 2/3. pp. 208–224. [Refs. in footnotes.]

The paper gives an account of experiments with antisera developed in rabbits by the injection of tapeworm antigen.

Alcoholic extracts of dried powdered substance of *Taenia saginata*, echinococcus and *Dibothriocephalus latus* were utilized, and also material which had been preserved in alcohol and then ground; various methods of preparing the injection material are described, one of which involves the use of pig serum as a vehicle. The antisera obtained were examined by the complement fixation and flocculation methods; the antigens were diluted by either a fractional or a rapid method but the dilution procedure caused no appreciable difference in results.

By quantitative experiments the author found evidence that a species-specific fraction is present in tapeworm substance.

Tests on patients harbouring *Dibothriocephalus latus* did not yield satisfactory evidence of the presence in their serum of tapeworm antibodies or antigen, but further experiments are contemplated.

D. B. Blacklock.

Miller (Harry M.), Jr. **Transmission to Offspring of Immunity against Infection with a Metazoan (Cestode) Parasite.**—*Amer. Jl. Hyg.* 1935. Mar. Vol. 21. No. 2. pp. 456–461.

" Offspring of female rats infected with *Cysticercus fasciolaris* showed a considerable degree of resistance to infection with onchospheres of *Taenia taeniaeformis*. Offspring of mothers actively immunized with *T. taeniaeformis* material had a lesser degree of resistance to infection with the onchospheres." *C. L.*

Miller (Harry M.), Jr. **Experiments on Acquired Immunity to a Metazoan Parasite by Use of Non-Specific Worm Materials.**—*Amer. Jl. Hyg.* 1935. Jan. Vol. 21. No. 1. pp. 27–34.

The definitive paper to which that already reported [this *Bulletin*, Vol. 29, p. 748] was preliminary. *C. L.*

Altenkamp (Th.). Akute Appendizitis bei Bandwurm. [**Acute Appendicitis in Tapeworm Infestation.**]—*Muench. Med. Woch.* 1935. Mar. 14. Vol. 82. No. 11. pp. 418–419.

In two appendices removed for appendicitis tapeworm segments were found. *C. L.*

Prümm (Albert). Ueber hochgradige Eosinophilie bei *Taenia saginata*. [**High Eosinophilia in *T. saginata* Infestation.**]—*Deut. Med. Woch.* 1935. Mar. 8. Vol. 61. No. 10. pp. 376–377.

An eosinophilia of 31 to 55 per cent. with no worm eggs in the stool, but with abdominal pain, remained unexplained until segments were passed. After removal of the worm eosinophilia rapidly disappeared. *C. L.*

Golob (Meyer). **Transduodenal Treatment of *Taenia saginata* Infestation.**—*Jl. Lab. & Clin. Med.* 1935. May. Vol. 20. No. 8. pp. 841–843.

An enthusiastic advocacy of the duodenal tube for treatment of *T. saginata* based on success with one case. *C. L.*

Mayeozoko (S.). **On the Distribution of *Hymenolepis nana* in Taito Prefecture, South-Eastern Part of Formosa, and its Mode of Infection.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1935. Apr. Vol. 34. No. 4 (361). [In Japanese pp. 459–470. [26 refs.] English summary p. 470.]

As the result of 7,618 faecal examinations, *H. nana* was found in 28·6 per cent. between 2 and 5 years old, in 44·6 per cent. between 6 and 10, in 10·7 per cent. between 10 and 15, and was very rare over 16 years. *C. L.*

Lapage (Geoffrey). **The Bearing of the Physiology of Parasitic Nematodes on their Treatment and Control.**—21 pp. [16 refs.] 1935. Imperial Bureau of Agricultural Parasitology. Winches Farm Drive, Hatfield Road, St. Albans. [3s.]

The gaps in knowledge of the physiology of parasitic nematodes are such as almost entirely to prevent advance in their control.

The aim of control is put thus :—

" Our task . . . should not be the impossible one of attempting to rid human beings or farm animals of all their nematode parasites,

or of trying to keep them free from these, but the very difficult but at least possible one of keeping these infections within bounds."

Indeed it is suggested that worm-free animals may possibly not be as healthy as those with a worm load since " the latter have evolved in association with these parasites and therefore are adapted to their presence," so that it is wiser " to seek to produce animals healthy because they are in equilibrium with their parasites " than to deworm. It is urged that knowledge of the physiology and so of the control of parasites will be incomplete until they can be kept alive in all stages *in vitro*. The unsheathing of larvae as a means for their destruction is considered. It is held unproved that blood imbibed by worms is used as food [haemoglobin is certainly absorbed]. Remedial measures based on a knowledge of the physiological relationship existing between host and parasite " would relieve us, for example, from the use of carbon tetrachloride which, efficient though it is, may have effects on the host, even when it is used by experienced workers, which are worse than those of the disease which it is designed to cure." *C. L.*

Tubangui (Marcos A.), Basaca (Mariano) & Pasco (Antonio M.). **Human Infestations with Ascaris and Trichuris in Different Parts of the Philippine Islands.**—*Philippine Jl. Sci.* 1934. Oct. Vol. 55. No. 2. pp. 91–113. With 4 figs. [16 refs.]

A study by Stoll egg counts of ascaris and trichuris infection in 3 places in the Philippine Islands.

The percentages of infection and the estimated number of eggs per cc. were : for ascaris 79·5 and 16,800, 74·3 and 15,800, 84·5 and 28,870 ; and for trichuris 88·1 and 4,400, 58·1 and 890, 87·3 and 2,900. Children are more often and, judging by egg counts, more heavily infected than adults. Ascaris infection was associated with soil fouling about houses, mainly produced by children of pre-school age.

C. L.

Lamson (Paul D.), Molloy (Daniel M.) & Brown (Harold W.). **Field Studies of the Anthelmintic Action of Ortho-Heptylphenol and 6-Hexyl-Meta-Cresol against** *Ascaris lumbricoides*, *Necator americanus* **and** *Trichuris trichiura*.—*Amer. Jl. Hyg.* 1935. Jan. Vol. 21. No. 1. pp. 188–199.

The authors report as follows :—

" 1. Ortho-heptylphenol and 6-hexyl-meta-cresol, substances which are the lowest members of their respective series of ortho-alkylphenols and 6-alkyl-meta-cresols which cause no whitening of the oral mucous membranes, have each been tested for their anthelmintic properties in approximately 100 cases harboring *Ascaris*, *Necator*, and *Trichuris*.

" 2. Ortho-heptylphenol reduced the egg count in ascariasis approximately 35 per cent., in uncinariasis, 60 per cent., and in trichuriasis, 40 per cent., in doses as great as 4 cc.

" 3. 6-hexyl-meta-cresol reduced the egg count in ascariasis approximately 55 per cent., in uncinariasis, 70 per cent., and in trichuriasis, 30 per cent., in doses as great as 4 cc.

" 4. In the 220 cases treated, no pathological signs or symptoms were noticed, no complaints were made by the patients, and all went about their daily work without interruption.

" 5. It is of interest to note that these two phenols have a relatively greater action on *Necator* than on *Ascaris*, as is the case with thymol, but which is the reverse of the action found in the alkyl resorcinols, as hexyl- and heptylresorcinol."

The method of egg counting was by 2 slides using the Stoll-Hausheer technique, or 0·01 cc. of faeces in all. *C. L.*

ADAMS (A. R. D.). **Ascariasis of the Liver.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1935. Jan. 25. Vol. 28. No. 4. pp. 419–420.

An acute abdomen with ruptured hepatic duct killed a Mauritian creole, 73 years old.

Autopsy showed one ascaris in the hepatic duct, seven in the bile-free gall bladder, and 10 in the bile passages of the right lobe of the liver. All were adult. The bile ducts exuded yellow muco-pus with many fertile and unfertile ascaris eggs, but though there was a mild subacute cholangitis there was no abscess formation. It was not possible to obtain the entire intestine for examination. *C. L.*

ALBERT (Jose) & PAULINO (Peregrino). **Mimicry in Ascariasis.**—*Jl. Philippine Islands Med. Assoc.* 1934. Dec. Vol. 14. No. 12. pp. 463–469.

Of 8 patients, one had symptoms simulating meningitis, one had melaena, one profuse haematemesis, one acute toxaemia, one severe abdominal pain, two abdominal tumours disappearing with anthelmintic treatment, one acute bronchopneumonia, and one ileocolitis. *C. L.*

MU (Jui-Wu). **Local Skin Reactivity in Rabbits to an Extract of *Ascaris lumbricoides*.**—*Proc. Soc. Experim. Biol. & Med.* 1935. Apr. Vol. 32. No. 7. pp. 995–997.

Author's summary :—

" Intradermal injection of rabbits with an extract of *Ascaris lumbricoides*, followed 24 hours later by intravenous administration oft he same extract, produced hemorrhagic necrosis which grossly and microscopically conformed with that described by Shwartzman." *C. L.*

KAMIMURA (Takeichi). **Report of a Case of Pulmonary Abscess caused by the Migration of an Adult Ascaris in Bronchi with a Review of Literature on the Injuries caused by *Ascaris lumbricoides*.**—*Jl. Oriental Med.* 1935. Apr. Vol. 22. No. 4. [In Japanese. English summary p. 62.]

After a death from rabies an ascaris was found in bronchi of the upper and lower lobes of the right lung and the lobes themselves contained abscesses. The summary does not refer to the literature reviewed. *C. L.*

GIRGES (Rameses). **II.—Diagnosis of Ascariasis.**—*Jl. Trop. Med. & Hyg.* 1935. Mar. 1. Vol. 38. No. 5. pp. 55–59. With 1 fig.

Largely a summary of literature in whose compiling the author acknowledges his indebtedness to this *Bulletin*. *C. L.*

Fülleborn (F.), Dios (Roberto L.) & Zuccarini (Juan A.). Bericht ueber eine im Auftrage der argentinischen Regierung unternommene Reise nach der Provinz Corrientes und nach Paraguay zum Studium der Hakenwurmbekämpfung mit Bemerkungen zur Frage der Immunität gegenüber Hakenwürmern.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Vol. 32. No. 9. pp. 441–481. With 6 figs. (1 map). [58 refs.]

——, —— & ——. Estudio acerca de la anquilostomosis en la provincia de Corrientes (encomendado por el Gobierno Argentino). [**Ankylostomiasis in the Province of Corrientes, Argentina.**]—*Rev. Inst. Bacteriológ.* Buenos Aires. 1934. July. Vol. 6. No. 3. pp. 249–294. With 5 figs. & 1 map. [58 refs.]

A belated abstract of work done in the Argentine before 1928 and recently republished.

Corrientes lies to the south of Paraguay and west of Rio Grande. The authors examined 396 of the civil population of ages ranging from 3 to over 60 years. They estimated the relative proportions of Necator and Ancylostoma, the clinical effects of infestation, the existence of helminths other than hookworms and they devote a section to prophylaxis. The reader must judge of the degree of the reliance he can place on findings based on so small a number of examinations; the authors state that in the northern part of the Province practically 100 per cent. of the rural population are infested with hookworms and fairly heavily. In children from 3–10 years there were on an average 4,816 ova per gram of (pasty) faeces (approximately 390 worms); in those from 11–20 years 6,885 ova (= 550 worms); from 20 years up 2,152 or 170 worms. In all districts visited infestation was greater in the young and in the females at all ages. Among soldiers who had been 3–4 months in barracks the degree of infestation was about half that of the civil population of the same age in the north of the Province, and 93–94 per cent. of the worms were Necator. Blood disturbance was comparatively slight; even in those heavily infected the Hb percentage was about 81 in men and 74–75 in women. The resistance to the results of infestation is ascribed to the diet containing plenty of meat and to the fact that there is considerable crossing with Indian blood. Of other worms Trichuris, Ascaris and Strongyloides were not uncommon and *T. saginata*, *H. nana* and Enterobius were also met with. Nothing fresh is suggested regarding prophylaxis. *H. H. S.*

Jamaica. Annual Report of the Medical Department for the Year Ended 31st December, 1933 [Hallinan (T. J.), Supt. Med. Officer].—102 pp. With 1 chart & 5 maps. 1934. Kingston. [**The Jamaica Hookworm Commission.** Appendix I, pp. 61–62.]

The work of the Jamaica Hookworm Commission, the direct descendant of the Rockefeller Hookworm Commission of 1919, is described for 1933.

In any area to be dealt with there are first made pit latrines at least 8 feet deep, with sloping sides to prevent collapse, and if in sandy soil lined with flat stones. The top is surrounded by a cement wall, high enough to prevent splashing if the ground water is high, and on this is placed a fly-tight seat box made of sound wood. Only in a demonstration area so prepared is treatment instituted. A trained inspector has charge of each area carrying 300 to 500 persons. After

explanation of reasons for the whole procedure faecal specimens from all persons are obtained (in 1933 from 38,698 of a total population of 38,745) and examined by Willis's direct gravity floatation method. The percentage found infected was 74. Treatment was given to 25,183, of whom 83 per cent. were held cured. The adult treatment was 24 minims of oil of chenopodium of unstated ascaridole content, a week later 40 grains of thymol, and a week later still, another faecal examination. *C. L.*

Yacob (M.) & Chaudhri (J. R.). **Hookworm Infection in the Punjab. Survey of a Rural Area in Ambala District.**—*Indian Med. Gaz.* 1934. Dec. Vol. 69. No. 12. pp. 669–672.

The results of a hookworm survey of 2 villages near Ambala, Punjab, India.

Stools of 150 persons were examined by a modified D.C.F., and egg counts were made on 100 of them by a modified Stoll's method. The incidence percentage was 82 and the average eggs per gram 422·7. The faeces had been transmitted by Maplestone's method. Of 119 persons found infected, 15 are classed as normal with no clinical symptoms and 192·5 eggs per gram, and the authors note "the fact that, on an average, an egg count of 192·5 is not of any clinical significance" [their average haemoglobin was 57·7]; 47 were moderately incommoded, usually by anaemia with or without digestive disturbance, and with an average egg count of 356·3 [their average haemoglobin was 56·9]; and 57 were severe cases with marked anaemia, breathlessness and palpitation and with an average egg count of 586·1 [their average haemoglobin was 52·1]. The incidence of infection was highest among cultivators, lowest among shopkeepers, with labourers and artisans intermediately placed, higher in males than in females, and higher in those below 40 years of age than in those above. House latrines are few, the sides of footpaths being mainly used. Women and children go barefoot; such males as do not nevertheless work barefoot in the fields. The modification of D.C.F. was that

> "The cover-slips, instead of being placed on plasticine cones, were placed directly on a microscopic slide and examined in the usual manner under the microscope. We found this modification of Lane's technique much more expeditious and convenient to work with than the original technique."

[The modification implies the need to examine about 400 sq. mm. instead of 9 sq. mm., while refraction of light at the edge of the cover renders invisible any eggs which may lie near it.] *C. L.*

Bertini (Gennaro). L'anchilostomiasi nella provincia di Firenze dal 1925 al 1930. [**Ankylostomiasis in the Province of Florence, 1925–30.**]—*Ann. d'Igiene.* 1935. Jan. Vol. 45. No. 1. pp. 32–40.

Ankylostomiasis, due to *A. duodenale*, is widespread in Italy and endemic in the Province and Commune of Florence. Some 400 cases have been found in 4 or 5 years. Fifty "infested zones" are mentioned with a total of 372 cases, but in 9 of the "zones" there was only a single case each, and 38 have under ten. The populations of these zones are not stated, so the incidence rate cannot be given. Of the total, 134 or 36 per cent. were between 10 and 20 years of age

and another 111 between 20 and 30 years; 179 were males and 193 females, all peasants or gardeners working in soil kept moist by irrigation. [Diagnosis appears to have been made by direct smear.]

H. H. S.

Maldonado Sampedro (Mariano). Un foco de necatoriasis importado en Castañar de Ibor. [**A Focus of Imported Hookworm Cases in Castañar de Ibor.**]—*Medicina Países Cálidos.* Madrid. 1935. May. Vol. 8. No. 5. pp. 217–232. With 4 figs. [35 refs.]

Examination of a family, which had returned to this locality in Spain three years previously after living for a time in Brazil, revealed the presence of hookworm in the mother. Further enquiry and examination of three other families comprising 25 individuals resulted in the discovery of 21 more passing the ova of Necator. Most of them were children. These three families had also returned to the district from abroad. Castañar de Ibor is north of the Sierras de Guadalupe separating Cáceres from Toledo. Now that the presence of these carriers is known steps will doubtless be taken to prevent infestation of other residents.

H. H. S.

Wickramasuriya (G. A. W.). **The Grave Risks of Hook-Worm Disease as a Complication of Pregnancy.**—*Jl. Obstet. & Gynaecol. Brit. Empire.* 1935. Apr. Vol. 42. No. 2. pp. 217–267. With 7 figs. (4 on 2 plates). [18 refs.]

At the De Soysa Lying-in Home in Colombo with total admissions of 5,500 a year, the highest death rate for both mother and child was due to hookworm infection.

Of 273 deaths which occurred in 1932–33, hookworm infection accounted for 27 per cent., puerperal sepsis for 12·8. Of 100 consecutive still-births 23 were due to hookworm infection, 14 to breech presentation, and 11 each to syphilis and pre-eclampsia; but this does not represent the hookworm's real effect on keeping down the live birth rate, since it takes no count of the abortion and miscarriage which the infection commonly causes. About 90 per cent. of those with hookworm disease show albuminuria and oedema in the last half of pregnancy. The pains of labour are often absent, perhaps from the mental dullness often present. The puerperium is often complicated. There may be fatal heart failure in labour or the puerperium, or the cardiac reserve may be permanently impaired. After delivery the anaemia may rapidly improve [the foetal hunger for iron has gone] but cardiac and renal reserves may never fully recover.

In the common oedematous clinical type the blood urea in mgm. per cent. is raised from local minima, average and maxima of 9, 15·25 and 20 (in 11 healthy cases) to 21, 57·3 and 73·5 (in 37 with hookworm disease) and renal function is always lessened from corresponding figures (in 10 cases) of 2·8, 3·3 and 4·0 to 1·3, 1·7 and 3·0 (in 37 cases), the urine being scanty, with low specific gravity and containing albumin and casts; in the 7 case histories given, haemoglobin varied from 15 to 35. In the rarer non-oedematous type the blood urea is usually below 20, albumin at most a trace, casts absent. When haemoglobin (which may be as low as 15) falls to 40 renal function becomes defective, urea concentration perhaps falling below 2 per cent. The diagnosis from pre-eclampsia, chronic nephritis, and pernicious anaemia of pregnancy is dealt with. Prognosis of that weight of

infection which the author has in mind is grave for both mother and child. As to the mothers 9 died during pregnancy, 7 during labour and 58 in the puerperium, and of these last the causes of death were cardiac failure 40, post-partum shock following normal delivery 7, sepsis 5, dysentery 3, pyelitis 2, and malaria 1, so that concomitant illness is a large feature in causing death. *C. L.*

Cruz (W. O.) [In Portuguese & English]. Pathogenia da anemia na ancylostomose. II.—Causas determinantes dos phenomenos regenerativos e degenerativos nessa anemia e contribuições para elucidar o seu mechanismo intimo. **Pathogenesis of Anaemia in Hookworm Disease. II.—Causes which determine the Regenerative and Degenerative Phenomena in this Anaemia and Contributions towards the Elucidation of their Inmost Mechanism.** III.—Modificações hematicas e organicas, provocadas pelas simples eliminação do Ancylostomo e do Necator, em individuos fortemente anemiados. **III.—Hematic and Organic Modifications, induced by Mere Elimination of Anchylostoma and Necator, in Individuals presenting Intense Anaemia.**—*Mem. Inst. Oswaldo Cruz.* 1934. Vol. 29. No. 2. In Portuguese pp. 263–426. With 30 graphs. [104 refs.]. In English pp. 427–485; In Portuguese pp. 487–540. With 10 graphs. [23 refs.] In English pp. 541–561.

The English version is not easy to understand, but it is believed that these notes render it rightly.

II. In 25 cases of ankylostomiasis it is confirmed that the anaemia is hypochromic and microcytic with little evidence of regeneration. The red cells lay between 900,000 and 4,580,000, their haemoglobin between 10 and 40 and their volume between 6 and 25. The presence of normoblasts, nuclear remainders and polychromatism was very rare. Iron is the only substance of value in treatment; raw liver, tryptophan, histidine, vitamin B, cobalt, manganese, arsenic, copper and diets rich in iron were useless. Iron eliminates degenerate red cells and causes reticulocytes to be made with an initial macrocytosis. It is held that with this treatment blood always becomes completely normal. Actually, the minimum average and maximum figures recorded at the end of treatment were: red cells in millions 3·55, 4·53 and 5·25, haemoglobin 62, 77 and 91, haemocrit readings 27, 33·7 and 41. As anaemia improves symptoms disappear. All these good effects are seen while the worms are left.

"During the observation of the course of the anemia, the degeneration of the hematic indices becomes conspicuous as an important factor both in the hypofunction of blood and in occasioning the appearance of the symptoms of the disease. We verified that, with one and the same Hb. rate in the circulating blood, the symptoms may either appear with great intensity or be absent according as the hematic indices may be degenerated or normal."

Accordingly it is held that the anaemia is not the result of a toxin nor of haemorrhage but is due to disturbance of iron metabolism.

III. Ten cases of ankylostomiasis were given anthelmintic but no other treatment. The minimum, average and maximum figures were: red cells before treatment 2,070,000, 2,620,000, 3,530,000 and after anthelmintic treatment 2,370,000, 4,270,000, 5,620,000; haemoglobin before treatment 22, 27·5, 38, and after it 23, 47·5, 75. The final conclusion is this:—

"The absence of blood modifications ascribable to elimination of the intestinal parasites and the resemblance of the blood regenerations induced

by iron both in the presence of helminthes in the intestine and after previous elimination of these parasites are very important verifications for the elucidation of the pathogenesis of the disease, and tend to confirm the essential importance of an organic insufficiency (iron deficiency) in the determination of the anemic syndrome and of the disease." *C. L.*

LANDSBERG (J. W.) & CROSS (S. X.). **The Blood Picture in Acute Fatal Infestations with** *Ancylostoma caninum.*—*Jl. Parasitology.* 1935. Apr. Vol. 21. No. 2. pp. 130–132. With 1 fig.

The infection produced an acute post-haemorrhagic anaemia, with a blood loss so great that death was inevitable, the haemopoietic system being unable to keep pace with the drain.

The puppies, 2 months old, were given by mouth "lethal doses" of hookworm larvae in gelatin capsules and died within 17 days of infection.

Besides the changes in erythrocytes shown in the accompanying table there was anisocytosis, slight poikilocytosis and achromia. The mucous membranes at death were perfectly white. No mention is made of any faecal blood passed during life or of blood in the intestinal contents after death.

Showing changes in the red cell picture during course of infection of three dogs (litter mates) with A. caninum.

Days on experiment	D 876			D 877			D 878		
	R.B.C.	Hb. (gm.)	C.V.	R.B.C.	Hb. (gm.)	C.V.	R.B.C.	Hb. (gm.)	C.V.
1	5·01	8·4	74	5·12	7·4	78	4·09	6·4	61
3	5·04	7·6	75	4·91	8·0	78	4·51	6·9	69
13	5·00	8·7	77	5·29	9·9	69	5·69	8·9	69
13		Infected			Infected			Infected	
17	4·77	6·7	63	4·78	6·7	63	4·62	6·7	63
20	4·95	6·7	69	4·89	7·6	74	5·09	7·3	75
24	3·03	4·5	67	3·87	5·5	75	4·46	6·4	67
27	1·93	2·7	68	3·06	4·3	65	3·97	5·0	72
29	1·61	2·1	62*					4·6	
30				2·16	2·2	65*	2·99	4·3	65*

R.B.C. = the number of red blood cells per cmm. blood expressed in decimals of a million (5·01 = 5·010,000).

Hb. = grams of hemoglobin per 100 cc. blood.

C.V. = the mean corpuscular volume in cubic microns.

* Blood sample obtained from heart immediately following death.

C. L.

FOSTER (A. O.) & CORT (W. W.). **Further Studies on the Effect of a Generally Deficient Diet upon the Resistance of Dogs to Hookworm Infestation.**—*Amer. Jl. Hyg.* 1935. Mar. Vol. 21. No. 2. pp. 302–318. With 3 graphs.

"Experimental studies on twelve dogs have furnished additional evidence that a generally deficient diet renders them more susceptible to infection with *Ancylostoma caninum.*"

" Seven of these animals which were kept until death on the deficient diet, showed a terminal breakdown of resistance which was characterized by a sharp increase in the daily egg productions of the infestations during the last 2 weeks of life. At autopsy these animals were found to be heavily parasitized, the number of worms varying from 155 to 614 in dogs which were from 7 to 19 months old at the start of the experiments. The data indicate, in general, that the resistance of the younger animals was more easily broken down by the deficient diet." *C. L.*

MAPLESTONE (P. A.). **A Simple Method of growing Hookworm Larvae.** —*Indian Jl. Med. Res.* 1934. Oct. Vol. 22. No. 2. pp. 203–214. With 1 text fig. & 2 figs. on 1 plate.

Maplestone describes and illustrates the apparatus with which he made his previous cultural experiments on hookworm eggs ; he reports that larvae will not migrate from culture apparatus of this type and that it is necessary to extract cultures for at least 2 successive days to be sure that nearly all the larvae they contain have been extracted.

These particular experiments were entirely uncontrolled generally or individually " because it has been shown by Maplestone (1924) [this *Bulletin*, Vol. 21, p. 967] that this is an efficient method of growing hookworm larvae, for it was used on that occasion to check the value of Stoll's egg-counting method, and many times more larvae were extracted from cultures than one was led to expect from the number of eggs estimated by counting." A piece of gauze made of non-corrosive wire, with 1 mm. mesh and 12 cm. square is, by overlapping the corners, made into a square basket with bottom 6 cm. long and sides 3 cm. deep the addition to which of a wire loop makes handling safer and quicker. In the basket is first put a covering of 50 cc. of coarse sand or small glass beads and then in a hollow made in this 8 cc. of earth which has been put through 3 mm. mesh gauze after being heated to 70°C. while moist and then pounded in a mortar. On the earth is poured 4·4 cc. of broken up faeces and water unmeasured but of the same degree of seeming fluidity. The baskets rest by their corners in inverted truncated cones of aluminium open at both ends, and these in turn in petri dishes containing a little water. The corners of the baskets are about 4·5 cm. from the surface of the water. The whole is put under a bell jar. No larvae were ever found in the water in the Petri dish, nor were they in closed funnels when the water in these was within 2 or 3 mm. of the bottom of the basket. But experiments made by suspending small baskets 3 cm. square on rods which rested on the mouths of beakers showed some larvae below them. [Presumably they got there either by forming the threads familiar in FÜLLEBORN's experiments, or by climbing up the suspending wire along the rod to the edge of the beaker and down the wall of the beaker to the water.] Extraction from these cultures disclosed from 277 to 982 larvae, but has to be continued for 2 days to show up most of them, 5 per cent. more being accounted for by continuing extraction for 7 days.

Maplestone thus quotes and contradicts the reviewer's view of the " unescapable need to trap cultures."

[This quotation divorced from its purpose and context is misleading. LANE, 1928, begins " Under grants from the Royal Society the writer has, during the past 2 years, been endeavouring to disentangle the

various factors which determine whether hookworm ova shall develop into larvae and whether larvae shall grow to infectivity." And LANE, 1932, in its first sentence says—" I have tried to separate the factors which favour their [hookworms'] extracorporeal development." To do so two things were necessary : to know the number of eggs with which each experiment started, and to be sure that all larvae that matured were accounted for. Maplestone has not attempted the first ; as to the second the conditions do not seem to preclude a great likelihood of the death of larvae in their attempt to leave the cage.]

C. L.

WATSON (W. H.). **Drainage as a Controlling Factor in the Spread of Hookworm.**—*East African Med. Jl.* 1935. Jan. Vol. 11. No. 10. pp. 308–315. With 9 figs. [14 refs.]

The author in Nyasaland reaches the following conclusions :—

" It is considered that the [natural] drainage factor plays a most important part in controlling the incidence of hookworm infestation among the native population of plain districts such as Port Herald [in which it is high] as compared with the population of mountainous districts such as Zomba [in which it is low]." *C. L.*

LANE (Clayton). **The Appraisement of Hookworm-killing Drugs.**—*Lancet.* 1935. June 22. pp. 1459–1464. [40 refs.]

The author points out that accurate scientific determination of the actual vermicidal value of any drug, and consequently the relative values of several cannot be reached unless answers are first obtained to certain questions, namely : 1. Should deworming be complete ? 2. Do egg-counts measure worm-loads ? 3. Do egg-counts measure faecal egg-content ? 4. Which is the best diagnostic technique ?

The evidence *pro* and *contra* for each of these is impartially marshalled. Colonel Lane shows as regards the first that a few (7–8) hookworms may give rise to severe symptoms while in another patient more than ten times as many may not. Hence, in the interest of the host, complete deworming should be the aim of treatment. As regards the second the author has himself shown that worm loads cannot be measured by faecal egg-counts with any approach to accuracy. Whether egg-counts are a measure of faecal egg-content depends obviously on the accuracy of the method employed, and putting natural bias aside (not an easy thing to do) the author shows by evidence that the D.C.F.F. technique is not only the most accurate egg-counting method, but that by it the faecal egg-content can be measured more accurately than by any other, provided the directions for its use are followed in every particular [this is a point which does, though it ought not to, need stressing].* The fourth question is thus inseparable from the third and the same answer applies. To sum up : " Evidence for complete deworming is the only stable criterion of drug efficiency " and " hygienic risk caused by infected persons can be graded rapidly, usefully and empirically " by the D.C.F. technique. Also " the lessening of hygienic risk produced by mass treatment is the proper and adequate measure of the success of such treatment."

* " D.C.F. or direct centrifugal floatation is a qualitative (yes or no) diagnostic technique which examines a single specimen obtained by a single centrifuging. D.C.F.F. or direct centrifugal floatation pushed to finality, is a quantitative technique, aiming at disclosing the total number of eggs present by examining 4 (plus 1) specimens from 4 (plus 1) centrifugings."

The following drugs are next considered *seriatim*: Oil of chenopodium, thymol, carbon tetrachloride, tetrachlorethylene and hexylresorcinol. Oil of chenopodium has no stable composition; its active principle, ascaridole, is very variable between 33 and 98 per cent. Though it is given arbitrarily regardless of the ascaridole content such a procedure is indefensible. Many tens of thousands of doses have been given and results of a kind reported, but only in a small proportion has the amount of active principle contained been known and the measurement of success has been gauged by other means than proof of deworming; hence, as the author states, he finds "no acceptable published evidence of its efficiency against hookworms."

Thymol crystals readily agglomerate into a mass and for success this drug must be particulated as, for example, by mixing with an adequate quantity of sugar of milk. It is, or has been, often taught that absorption should be prevented, but Lane holds that the drug only acts after absorption. Evidence goes to show that two, 60 grain, courses of the drug will result in deworming in about half the cases in adults. It is a safe drug in practice because toxic symptoms occur early and the intoxicating dose is well below the lethal dose.

As regards carbon tetrachloride, it has been stated that after large doses much is passed unchanged and that large doses are safer than small ones. This is hardly credible, for the amount absorbed constitutes the danger. The minimum lethal dose is 1·5 cc. but doses up to double this are often given and its toxic effects depend on individual susceptibility.

The dosage of tetrachlorethylene employed by GARRISON is 3 cc. weekly, 1 cc. in three successive hours, for a child of 10 years, the patient being kept in bed on the day of treatment and the third dose being followed by a purge. This quantity is given for 3 weeks, *i.e.*, 9 cc. in all. No death has as yet been reported and "the drug merits massive, controlled, field investigations, but present claims to its preeminence are premature."

No attempts have been made to evaluate the results of hexylresorcinol by the only sound test—deworming. It is liable to cause local irritation and erosion and on that account its purchase has been restricted in U.S.A.

In default of deworming tests there remain comparative tests with control of single factors. One such (the only one discoverable) was effects of thymol in a 60 grain dose, ascaridole 1 cc., and carbon tetrachloride 1 cc. on *A. duodenale* and *N. americanus*, by CAIUS and MHASKAR using the Schüffner-Vervoort method. Thymol gave 96·1 and 99·6 per cent. success on the two worms respectively, ascaridole 60·9 and 83·4, and carbon tetrachloride 11·5 and 90·8. This supports the author's conclusion that thymol heads the list "especially when safety and efficiency are both considered, it being again stated emphatically that *safety must have the first place.*" [The article, apart from its intrinsic value, has the additional merit of almost necessarily provoking argument and further research.] *H. H. S.*

i. TUXFORD (A. S.); ii. LANE (Clayton). **Administration of Carbon Tetrachloride for Hookworm.** [Correspondence.]—*Lancet.* 1935. June 1 & 8. pp. 1302; 1357.

i. Tuxford advocates carbon tetrachloride with castor oil for hookworm. Having treated many hundreds of such cases without a death

he advises 3 cc. of tetraform with ½ oz. of castor oil. Discomfort after it is rare. It is advised as having no ill effects.

ii. Lane points out that GIGLIOLI [this *Bulletin*, Vol. 21, p. 972] felt that the same result was produced by shaking carbon tetrachloride in water, and that both experiments were uncontrolled and of insufficient extent. The only animal experiment traced was one by Maurice HALL; it suggested that the mixture was not efficient; but this could not be determined by herd treatment. *C. L.*

VAN SLYPE (W.). Sur la détermination des strongylides humains d'après les dimensions de leurs oeufs. [**Determination of Human Strongylidae from Dimensions of Ova.**]—*Bull. Soc. Path. Exot.* 1934. Dec. 12. Vol. 27. No. 10. pp. 939–942.

The range of the paper is that which the title shows.

The paper concerns Lomami, in Katanga, and judging by the size of the eggs, presumably in smears, of 100 persons examined the percentages infected with the various strongyle parasites were estimated as follows: *A. duodenale* 53, *N. americanus* 74, *A. braziliense* 2, Ternidens 19, Trichostrongylus 10. Of the ternidens egg the distinctive points are its width of 45–56μ, its length of 73–80μ, its double contour, the cells numbering 6 to 12, well defined with obvious refractile nuclei, the shell having a double contour. *C. L.*

McCOY (O. R.). **Artificial Immunization of Rats against** *Trichinella spiralis*.—*Amer. Jl. Hyg.* 1935. Jan. Vol. 21. No. 1. pp. 200–213.

The author's summary is as follows:—

"The majority of rats given six intraperitoneal injections at 5-day intervals of living trichina larvae, heat-killed larvae, or dried and powdered larvae, developed some degree of immunity against a subsequent light infection with *Trichinella spiralis*. The degree of immunity in the individual animals varied from none to practically complete. The injection of living larvae was usually more effective in establishing immunity than the injection of either heat-killed larvae or dried and powdered larvae. Artificially immunized rats showed little or no resistance to the initial development of adult worms in the intestine but the worms were lost more rapidly than in control animals. This, of course, would result in a smaller amount of muscle invasion in the immunized rats. The immune state produced by the injections is apparently of the same general nature as that brought about by actual infection; in each instance the mechanism is directed against the intestinal stages of the parasite. The former immunity, however, is not nearly as potent as the latter and is much more easily broken down by large doses of larvae." *C. L.*

ROTH (Hans). Ein Beitrag zur Frage der prenatalen Trichineninfektion. [**Prenatal Trichinella Infection.**]—*Acta Path. et Microb. Scandinavica.* 1935. Vol. 12. No. 1–2. pp. 203–215. [25 refs.]

Foetal trichinous infection was produced in guineapigs, the larvae in the young being at the same stage of their development as those in the mothers. *C. L.*

Baudet (E. A. R. F.). Over de werking van causyth op trichinen bij ratten. [**Action of Causyth on Trichinae in Rats.**]—*Tijdschr. v. Diergeneesk.* 1935. May 15. Vol. 62. No. 10. pp. 527–532. English summary (6 lines).

Causyth, a coal-tar preparation containing sulphur, was used with apparent success by Weltmann (1931) in a case of human trichinosis. The author found it useless in the prevention of intestinal or muscular trichinosis in rats, and concludes that its action in man was not specific.

A. G. B.

Wu (L. C.). **Chronic Salpingitis caused by** *Oxyuris vermicularis.* **Report of a Case.**—*Chinese Med. Jl.* 1935. Mar. Vol. 49. No. 3. pp. 256–259. With 2 figs. on 1 plate.

A small yellowish nodule in the wall of the left fallopian tube showed on section many thread worm ova in a " capsule," The faeces showed ascaris ova. The operation had disclosed much-dilated, tortuous and congested tubes matted to ovaries and uterus. *C. L.*

Schultz (R.) & Ivanitski (S.). **Gongylonematosis of Man, with the Description of a New Case.**—*Med. Parasit. & Parasitic Dis.* Moscow. 1934. Vol. 3. No. 6. [In Russian pp. 516–527.]

The total number of cases of Gongylonema infections reported from man is seven. The authors describe a new case from Kharkov (Ukraine). A review is given of the literature on gongylonematosis and the question of its possible rôle in the aetiology of cancer is discussed. The parasite is identified as *Gongylonema pulchrum.* *C. A. Hoare.*

Keller (Alvin E.). **The Occurrence of Eggs of** *Heterodera radicicola* **in Human Feces.**—*Jl. Lab. & Clin. Med.* 1935. Jan. Vol. 20. No. 4. pp. 390–392. With 1 fig.

The eggs were obtained from the faeces of 34 of 44,380 whites and 5 of 6,441 negroes in Mississippi. It is believed that they can be mistaken for unfertile ascaris or hookworm eggs and so may lead to unnecessary giving of anthelmintics. *C. L.*

Hu (Stephen M. K.) & Yen (C. H.). **Studies on the Comparative Susceptibility of** *Culex pipiens* **var.** *pallens* **Coquillet and** *Culex fatigans* **Wiedemann to Experimental Infection with** *Wuchereria bancrofti* **Cobbold.**—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 483–490. [12 refs.]

A continuation of experiments already recorded [this *Bulletin,* Vol. 31, p. 804] on susceptibility of the mosquitoes noted in the title. The maximum microfilarial count in the mosquito-meal-provider was 248 in 20 cmm. of blood as compared with 23 in the earlier series. Both species of Culex were fed on him at the same time and the time of reaching full development in each was about the same, and of those surviving for this period 90·1 per cent. of *C. p. pallens* and 94·5 per cent. of *C. fatigans* were infective. In both, larvae from one feed might fail to reach infectivity while those from another might do so. The average number of infective larvae in each *C. p. pallens* was 14·4 and in each *C. fatigans* 7·3. *C. L.*

Hu (Stephen M. K.). **Experimental Infection of *Culex fatigans* Wiedemann from Foochow, Fukien Province, with *Wuchereria bancrofti* Cobbold.**—Reprinted from *Lingnan Sci. Jl.* Canton. 1935. Jan. 1. Vol. 14. No. 1. pp. 87–92. [10 refs.]

Of 193 *Culex fatigans*, bred from larvae collected in Foochow and fed on a filarial subject with many microfilariae in the blood, 70 per cent. harboured embryos on dissection; 141 survived the period of incubation and of these 96 harboured infective larvae, that is 50 per cent. of those fed and 68 per cent. of those surviving. *C. L.*

Feng (Lan-chou). **Some Experiments with Mosquitoes and *Microfilaria malayi* in Huchow (Chekiang, China).**—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 491–494.

The author gives the following account of his experiments.

" 1. Experiments with five species of mosquitoes for the transmission of *Microfilaria malayi* were carried out in Huchow, Chekiang Province in the summer (July–August) of 1933.

" 2. Partial development of *Microfilaria malayi* took place in *Culex pipiens*, *Stegomyia albopictus* and *Armigeres obturbans*.

" 3. Normal development of *Microfilaria malayi* has been observed in *Mansonia* (Mansonioides) *uniformis* up to the 4th day after which a certain number of the embryos died and only comparatively few reached maturity 8 days after the infective feed.

" 4. Normal development of *Microfilaria malayi* took place in *A. hyrcanus* var. *sinensis*. The filarial embryos reached maturity on the 6th day and from the 6th to the 8th day after the infective feed invasion of the labium by mature larvae was very common. As many as 59 mature, actively motile larvae have been found in one mosquito in various parts of the body including the labium.

" 5. *A. hyrcanus* var. *sinensis* is probably the most important carrier of *Microfilaria malayi* in the Huchow area although *Mansonia* (Mansonioides) *uniformis* may also participate in the transmission of this parasite." *C. L.*

Romiti (Cesare). **Filariasis in British Guiana. A Comparative Study of *Filaria bancrofti* and *Filaria ozzardi* Infections.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1935. Apr. 17. Vol. 28. No. 6. pp. 613–626.

" *Filaria bancrofti*. . . . The presence of the adult worm in the varicolymphocele of the cord is constant. The site where the worms are found is always the same, viz., in the distal portion of the lymphatic plexa of the cord, in proximity to the epididymis. . . . The author has not been able to find adult living worms in any other situation, nor to observe, in any other district of the lymphatic system, the lesions which are characteristic of invasion by the adult worm.

" *Filaria ozzardi*. On no occasion were any traces of adult worms seen nor was there observed any pathological change in the lymphatic system of those infected with *F. ozzardi*."

The paper summarizes the conclusions drawn from the clinical and pathological findings in over 7,000 cases. It is confirmed that in British Guiana *Wuchereria bancrofti* is limited to the coastal district. It affects, as evidenced by microfilariae in the blood, 40 per cent. of negroes

and Portuguese, 20 per cent. of East Indians, and few Chinese, is rare under 10 years of age, is periodic in direct relation to the intensity of the infection with the higher count at night, the physical signs affecting the lymph glands are mainly confined to those draining the genital organs, especially to the "mesial superior group of the superficial subinguinal lymph glands," varicolymphocele is constant in the male and an "elephantoid condition of the broad and ovarian ligaments" in the female.

Filaria ozzardi is confined to the interior; race, sex and age do not influence it; is without variation of the microfilarial count from day to day and hour to hour, and causes no physical signs. *Mf. bancrofti* was found in no fluid, ascitic, synovial, cystic, other than in cysts connected with the cord or internal female genital organs; *Mf. ozzardi* has been found only in the peripheral blood in admittedly incomplete examinations. The site of adult *W. bancrofti* in Romiti's view is as quoted above. Since from tissue removed at operation and placed in warm saline adults, if present in patent lymphatics, emerged with rapid twisting movements, it is held logical to conclude that the same holds after death and that the worms then migrate from superficial into deep lymphatics. No adults of *F. ozzardi* were seen, nor was any pathological change in the lymphatic system attributable to them discovered. In both infections bacteria were not discovered apart from acute inflammation and then the organism was predominantly *Staphylococcus pyogenes aureus.* *C. L.*

Neuber (Eduard). Beiträge zur Diagnose, Epidemiologie und Therapie der Filariase (*Filaria bancrofti*) auf Grund zweier Fälle. [**Two Cases of** *W. bancrofti* **Infection. Treatment.**]—*Arch. f. Dermat. u. Syph.* 1935. May 31. Vol. 171. No. 5. pp. 515–525. With 3 figs.

Two cases are described in whom the scrotum and penis showed lymphangiectatic vesicles and who were treated with malaria and gold. In both it is stated that microfilariae were present in the blood. In one the microfilariae disappeared and the lymphangiectasis lessened. The other is under observation. *C. L.*

Davis (Nelson C.). **An Investigation of Possible Vectors of** *Wuchereria bancrofti* **(Cobbold) in Bahia, Brazil.**—*Jl. Parasitology.* 1935. Feb. Vol. 21. No. 1. pp. 21–26. [10 refs.]

The chief transmitter of *W. bancrofti* infection in Bahia, Brazil is *Culex fatigans.*

"1. Experimental proboscis infections with *Wuchereria bancrofti* (Cobbold) were obtained in the following mosquitoes: *Culex fatigans* Wiedemann, *Mansonia* (*Rhynchotaenia*) *justamansonia* (Chagas), and *Anopheles* (*Nyssorhynchus*) *albitarsis* Arribálzaga.

"2. Advanced development of larvae took place occasionally in *Anopheles* (*Nyssorhynchus*) *bachmanni* Petrochi and in *Culex nigripalpus* Theobald. Retarded development was also noted in one specimen of *Anopheles* (*Nyssorhynchus*) *tarsimaculatus* Goeldi.

"3. A slight degree of development, followed by degeneration, occurred in *Aedes* (*Stegomyia*) *aegypti* (Linnaeus) and in *Aedes* (*Ochlerotatus*) *fluviatilis* (Lutz).

"4. No metamorphosis was noted in *Aedes* (*Ochlerotatus*) *taeniorhynchus* (Wiedemann) or in *Aëdes* (*Ochlerotatus*) *scapularis* (Rondani). Invasion of the thorax occurred only once in *Aëdes taeniorhynchus* and never in *Aëdes scapularis*." *C. L.*

NEUBER (Eduard). Ueber den Heilwert und Wirkungsmechanismus der Goldpräparate, mit besonderer Rücksicht auf einige chronische Infektionskrankheiten (Sklerom, Aktinomykose, Filariase). [**Curative Value of Gold Preparations with Special Reference to Filariasis.**]—*Wien. Klin. Woch.* 1935. Apr. 19. Vol. 48. No. 16. pp. 486–490. [13 refs.]

Gold had no influence on 2 cases of infection with *F. bancrofti*. After combination with malaria one was cured 4 years later. *C. L.*

TISSEUIL (J.). De la longévite des microfilaires de la sarigue *Philander* dans la circulation générale. [**Longevity of Microfilariae of Opossum in Circulation.**]—*Bull. Soc. Path. Exot.* 1935. Mar. 13. Vol. 28. No. 3. pp. 193–194.

A single microfilaria was found 6 and 11 days respectively after blood rich in embryos had been injected into the peritoneal cavities of two other opossums [see TISSEUIL, this *Bulletin*, Vol. 32, p. 278]. *C. L.*

MONTEL (M.). Le carbone animal intraveineux dans le traitement des rechutes aiguës fébriles de la lymphangite chronique éléphantiasigène des pays chauds. [**Animal Charcoal Intravenously in the Treatment of Acute Relapses of Chronic Lymphangitis.**]—*Bull. Soc. Path. Exot.* 1935. Mar. 13. Vol. 28. No. 3. pp. 171–174.

A severe case of lymphangitis responded dramatically to intravenous injections of animal charcoal.

A man of 45 had had for 10 years lymphangitic attacks which had left permanent enlargement of the right leg. The three attacks which Montel had observed never retrogressed before the 8th or 10th day, and necessitated a slow convalescence. In the last the temperature reached 40·5°C., with shivering, delirium, pulmonary congestion, lymphangitis in the right leg and corresponding painful adenitis. An intravenous injection of 5 cc. of a 2 per cent. suspension of finely ground animal charcoal in physiological (normal) serum on the second day and one of 10 cc. on the third day were followed by a return to 37°C. (98·4°F.) on the fourth day, with a recovery of well-being so complete that the man insisted on taking forthwith a business journey of 400 km. by car. He took 15 cc. ampoules for daily injections and supported the journey well. *C. L.*

MARTÍNEZ-BÁEZ (M.). Sur la structure histologique des nodules à *Onchocerca volvulus* et *O. caecutiens*. [**Histological Structure of Onchocerca Nodules, *Volvulus* and *Caecutiens*.**]—*Ann. Parasit. Humaine et Comparée.* 1935. May 1. Vol. 13. No. 3. pp. 207–230.

A comparative study of the structure of onchocerca nodules, based on 21 specimens from Africa and 28 from America, described in detail, though the author's experience covers 61 specimens in all.

The skin over nodules is never normal. The epidermis is practically so ; the dermis never, having very often an oedema, and always showing numerous foci of cellular infiltration, most markedly so in deeper layers. These are apt to form sleeves round dilated blood and lymph vessels, and comprise lymphocytic, histiocytic, plasmocytic and eosinophilic types. The nodules are almost always sharply delimited by a fibrotic capsule composed of concentric collagenous fibres often undergoing hyaline degeneration, the spaces between being occupied by macrophages, histiocytes, lymphocytes, some polynuclears and eosinophils and a few labrocytes and often harbouring microfilariae. The uteri contain the young, which may be in various stages from egg to fully developed larva, but it is particularly noted that, when the latter are present in the uteri, there are abundant microfilariae in the tissues of the nodule and in the superjacent skin [an observation which suggests that in onchocerca the parturition of each female takes place when the products of parturition fill the uteri]. In one case there were in the nodule microfilariae of double the normal length as described by Ochoterena. In the same nodule there may be found normal and disintegrating adult worms, and of the cellular elements giant cells were generally very numerous particularly in nodules from America.

The differences discovered between nodules from the old and new worlds are tabulated thus, it being noted that their structure is essentially the same, and that the observed differences need further investigation.

	"O. volvulus."	"O. caecutiens."
Perivascular infiltration of the dermis ...	Little accentuated	Marked
Microfilariae in the overlying dermis ...	Many	Few or absent
Granulomatous tissue in the centre of the nodule	In small areas	In larger areas
Local eosinophilia	Frequent and intense	Frequent but light
Dead and living parasites in the same nodule	Frequent	Not seen
Cavities with fibrinous fluid	Frequent	Rare
Cavities with purulent fluid	Rare	Frequent
Disintegrating worms	Frequent	Rare

C. L.

Bryant (J.). **Endemic Retino-Choroiditis in the Anglo-Egyptian Sudan and its Possible Relationship to** *Onchocerca volvulus*.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1935. Mar. 8. Vol. 28. No. 5. pp. 523–532. With 1 map & 5 figs. on 2 plates.

Two ocular conditions are associated with devastating blindness in the Sudan, of which one is certainly and the other inferentially caused by onchocerca infection. The infection has been endemic for years, but has recently taken on epidemic character.

About 4 years ago Bryant's attention was drawn to one of these conditions which he calls " Sudan blindness," the lesion being gross retino-choroiditis with optic atrophy. Hissette suggesting that it might be due to *O. volvulus*, further investigation has shown blindness

to be appallingly common in places. Thus 8 per cent. of Dinka taxpayers were exempted for blindness contracted during last year; of the Bellanda tribe 4·5 per cent. were totally blind; 8 blind were found in a family of 13 on the Naam river, 14 of 21 in 4 huts near Wau, 4 of 6 in the Tonj district. Most of these were due to retino-choroiditis but some, definitely, to onchocercal punctate keratitis.

To take the latter first, the onset is with intense irritation (even severe pain) and enduring lachrymation. A case seen a month after onset showed dilated pupils, some loss of corneal lustre, oedematous and rather red conjunctiva, fundus covered with pigment patches, optic disc pink and rather indistinct in outline. Vision is usually better in early morning and late afternoon when glare is less, the eyes are shielded, the man keeps in the shadow and tears stream down his cheeks. The media become opaque and adhesions slowly obliterate the pupil. Microfilariae have always been present on puncturing the anterior chamber under 2 per cent. pantocaine with a tuberculin syringe. On sectioning the eye microfilariae are found throughout it, the cornea is vascular, the sclerotic and choroid show a plasma cell reaction, the ciliary body marked inflammatory and fibrotic change.

As for Sudan blindness the slight initial irritation and lachrymation end usually within 3 weeks, when night blindness becomes established. The eye looks normal, but within 2 to 5 months blindness is established. The media are clear, though cataract is not uncommon. Microfilariae are not found on puncturing the anterior chamber. The appearance of the fundus with its patches of retinal pigment, this tissue being otherwise rarified allowing the choroidal vessels to shine through it, is illustrated. On sectioning, microfilariae were entirely absent, the cornea, ciliary body and choroid showed no inflammation, the retinal layers, especially that of nerve fibres, are irregularly atrophied and the cell layers lessened in numbers, the retina shows pigment masses on, and within, it, and its vessels are more numerous than usual, but have no cellular reaction round them.

As to the first condition, the presence of intraocular microfilariae and of onchocerca nodules leaves no doubt as to its causation. As to the second Bryant gives reasons for excluding as causes organic poisons, antimony as a cosmetic, nephritis, diabetes, yaws, eating of cassava root to excess, heredity, consanguinity, famine and vitamin A deficiency; but a possible association with *Onchocerca volvulus* is suggested by the following. Of 750 adults paraded for sleeping sickness inspection 9 per cent. showed manifestations of this infection namely: thickened skin, onchocercal tumours, keratitis, hydrocele, and elephantiasis. The last two are included because *W. bancrofti* is unknown here and because *Mf. volvulus* has been found in swarms in elephantoid tissue and in hydrocele fluid and sac. On the other hand, of a number of cases of "Sudan blindness" 58 per cent. showed these visible evidences of *O. volvulus*, or 49 per cent. more than the average of the adult population.

As to tumour distribution the author agrees with HISSETTE that tumours on the head are more apt than others to give rise to the known ocular manifestations of *O. volvulus*, and records that the nodules may produce deep erosion of the frontal bone.

Simulium damnosum is common, indeed at times is a swarming scourge, was present in hundreds in a rest house kitchen 1 km. from water, and appeared to be thoroughly domestic, none being found outside on the road. *C. L.*

BOASE (A. J.). **Ocular Filariasis.**—*East African Med. Jl.* 1935. Jan. Vol. 11. No. 10. pp. 326–328.

Case of a Muganda whose left eye was sightless with evidence of kerato-iritis, the right having vision 6/5 and microfilariae in the anterior chamber.

The history was acute. It appears that both eyes began to water and ache, the right became apparently normal in a few days, the left deteriorated rapidly and its sight was lost in 6 weeks. Examination 4 months after the onset " revealed nothing abnormal in the right eye except evidence of past papillitis. . . . The left eye showed intense ciliary congestion, a very hazy cornea, profuse keratitic precipitate (visible to the unaided eye), and posterior synechiae. The fundus was completely obscured." Examination of the right eye with a corneal microscope revealed many nematode larvae. The description is as follows :—

" Prolonged examination revealed many of these organisms. At one instant four were in focus in close proximity to each other, while rapid movements of the beam of light across the anterior chamber disclosed others. The manner in which they propelled themselves through the aqueous immediately suggested to my mind the well-known antics of the mosquito larva, though I think that a better description of their movements would be to say that they tied themselves into knots and untied themselves with amazing rapidity. For this reason it was difficult to form an estimate of their individual length, but in a few instances in which a larva (for such they were deemed to be) was momentarily straightened out a rapid comparison led me to judge its length to be approximately equal to the depth of the optical section of the cornea, that is about a third of a millimetre."

Mf. perstans was present in the blood, but the embryos were not found in the eyes of other patients in whose blood they were present. [The history, the ocular symptoms (*cf.* BRYANT, above) and the estimated size of the microfilariae are suggestive of infection with *Onchocerca volvulus*. The grave blinding effects of this worm, not only in the Belgian Congo but in the Sudan, must give rise to anxiety as to whether the case cited is not the first reported evidence of its presence in Kenya Colony. The existence of nodules is not mentioned.] *C. L.*

PRESTON (P. G.). **Report of a Case of Human Onchocerciasis in Kenya.** —*Jl. Trop. Med. & Hyg.* 1935. Apr. 1. Vol. 38. No. 7. p. 81.

This is believed to be the first case of onchocerciasis microscopically identified in Kenya.

The man had always lived in South Mugrango in the Kisii Reserve except for service as a porter with the King's African Rifles near Kilimanjaro during the Great War. He had four swellings on the left side of the chest, in both axillae, both iliac fossae, both popliteal fossae, and under the left angle of the lower jaw. On excision the swellings contained onchocerca worms. The man had complained of pain in the temporal region as if a knife were thrust into the backs of his eyes, and stated that he had had occasional and temporary blurring of vision and that this was now becoming impaired. The swellings were of about 2 years duration and had steadily grown. Vision and eye grounds are not reported on. *C. L.*

Issajev (L. M.). Einfache Methode zum Nachweis der Nematoden-Larven in den Crustacea. [**A Simple Method for the Detection of Nematode Larvae in Crustaceans.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1934. Vol. 3. No. 3. [In Russian. pp. 238–240. German summary p. 240.]

Working on the transmission of guinea-worm larvae by cyclops, the author devised the following method for the rapid examination of large masses of these crustaceans. Captured cyclops are placed in test-tubes from which most of the water is pipetted off and which are kept at 35–36°C. for 1–2 days, after which the contents are examined under a microscope at a magnification from 25 to 75. By this time the majority of the crustaceans are macerated and broken up, while the Dracunculus larvae retain their normal structure and can easily be detected. This method is based on the fact that under natural conditions the larvae escape into the outer world only after the death and decomposition of their vector. It is suggested that it might be applied for the examination of crustacean vectors in the case of the larvae of other nematodes and cestodes. *C. A. Hoare.*

Issajev (L.). Ueber die Eindringung der *Dracunculus medinensis*-Larven in den Cyclops. [**On the Method of Penetration of the Guinea-Worm Larvae into Cyclops.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1934. Vol. 3. No. 3. [In Russian. pp. 212–230. With 13 figs. [20 refs.] German summary p. 230.]

Working in Turkestan the author conducted a series of experiments with the view to determine the method by which the larvae of *Dracunculus medinensis* penetrate into the local vectors, *Cyclops oithonoides* and *C. vicinus*.

The copepods and the nematode larvae were placed together in watch-glasses containing distilled or filtered pond-water and were observed under a microscope. The cyclops actively hunts the larvae and ingests them. To facilitate the observation of the larvae within the body of the crustaceans, these were starved and placed between slide and coverslip sealed with vaseline. About 5–6 hours after ingestion, but sometimes after a few minutes, the larvae pass into the body-cavity of the cyclops by actively boring head first through the stomach wall. Active penetration of the larvae through the integuments of cyclops could not be observed under the most favourable conditions. Similar experiments conducted with a number of Cladocera showed that they were incapable of ingesting guinea-worm larvae, while those taken up by Diaptomus passed through its intestine and were discharged from the anal aperture unaltered. The paper contains a detailed illustrated account of the structure of the alimentary tract of cyclops and of its feeding methods. *C. A. Hoare.*

Issajev (L.). Experimentelle Dracunculosis beim Hunde. [**Experimental Dracontiasis in Dogs.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1934. Vol. 3. No. 3. [In Russian pp. 231–238. With 5 figs. German summary pp. 237–238.]

Description of the results of experimental infection of dogs with *Dracunculus medinensis* undertaken in Turkestan between 1927 and 1932. Pups from 4 to 6 months old were starved for 24 hours and each given 100 cc. of water in which were infected cyclops, containing a total

of 25–50 guinea-worm larvae, the last having moulted twice. Of 42 pups 27 became infected. Dissection of the worms at various periods of time (up to one year) following the infective meal showed that its development up to the production of ripe, motile larvae, takes 9–10 months. Males could not be found. In one case cyclops were infected with larvae isolated from a worm obtained in one of the experimental infections ; after developing for 13 days in the crustaceans 25 larvae were fed to another pup and gave rise to an infection with 5 adult worms the uteri of which contained motile larvae when examined about 9 months later. It is suggested that the successful experiments coupled with the finding of naturally infected dogs points to the latter as sharing with man the rôle of final hosts. The incidence of dracontiasis in the town of Old Bokhara was 30 of 30,000 of the human population and 5 of 2,023 dogs examined. *C. A. Hoare.*

Ramsay (G. W. St. C.). **Observations on an Intradermal Test for Dracontiasis.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1935. Jan. 25. Vol. 28. No. 4. pp. 399–404.

The antigen for the test was obtained from guinea-worm and the results, which were satisfactory, indicated a high rate of infection in Northern Nigeria.

To 100 cc. of ether was added 0·25 gm. of dried powdered guinea-worm with frequent shaking at room temperature for 2 hours to remove lipoids. The dried ether-free residue was extracted, with shaking, for 4 hours in 100 cc. of 0·85 per cent. sodium chloride at 37°C. After centrifuging and passing through a No. 6 Seitz filter, 0·25 cc. of this 0·25 per cent. saline extract was used for injection, a positive wheal being one at least 2·3 cm. across, with outrunners. Of 41 visibly infected cases 85 per cent. gave an immediate positive result. Of 187 persons in a non-endemic area a negative reaction was obtained in 84 per cent. " and a spurious positive reaction in 16 per cent." There was failure to produce an antigen suitable for a precipitin test. Of 1,267 other persons in Northern Nigeria 47·6 per cent. gave an immediate positive reaction, suggesting that this persists for years after infection has ceased, and that in some local areas dracontiasis is hyperendemic. *C. L.*

Moorthy (V. N.). **The Influence of Fresh Bile on Guinea-Worm Larvae encysted in Cyclops. (A Preliminary Report.)**—*Indian Med. Gaz.* 1935. Jan. Vol. 70. No. 1. pp. 21–23. With 2 figs.

Bile kills cyclops and activates guinea-worm larvae which they harbour.

Like 0·2 per cent. hydrochloric acid, fresh bile of certain species of the fish genus *Barbus* killed cyclops in 1 to 2 minutes and so activated guinea-worm larvae within that they disorganized the host's internal structure and might escape from its body after 30 to 35 minutes, usually at the junction of the anal segment with the furcal rami. With fresh goat's and sheep's bile the corresponding figures were 30 to 36, and 60 minutes, and in human bile from a suicide 6 hours after death 20 and 79 minutes. In Barbus some development of the guinea-worm larva is believed to occur. The work continues. *C. L.*

Erratum.

Vol. 32, No. 4, p. 246, BEQUAERT's summary, line 3 of title, *for* Blandfordia *read* Blanfordia, *and for* H. A. PILSBURY read H. A. PILSBRY. Also in text of summary read Blanfordia for Blandfordia throughout.

ASHKAR (M. F.) & ISSA (I. I.). Bilharzial Haemospermia.—*Jl. Egyptian Med. Assoc.* 1935. Apr. Vol. 18. No. 4. pp. 274–283.

CAWSTON (F. G.). Elephantiasis in South Africa and Basutoland.—*Jl. Trop. Med. & Hyg.* 1935. Feb. 1. Vol. 38. No. 3. p. 34. With 1 fig.

CHEN (H. T.). A Preliminary Report on a Survey of Animal Parasites of Canton, China, Rats.—Reprinted from *Lingnan Sci. Jl.* Canton. 1933. Feb. Vol. 12. No. 1. pp. 65–74. [10 refs.]

CHEN (H. T.). On a Method of expelling Disintegrated Tapeworms in *Ctenocephalides felis*.—Reprinted from *Lingnan Sci. Jl.* Canton. 1933. May. Vol. 12. Supp. pp. 43–48.

CHEN (H.T.) & WANG (Shou-chi). Notes on Some Abnormal *Clonorchis sinensis*.—Reprinted from *Lingnan Sci. Jl.* Canton. 1933. Oct. Vol. 12. No. 4. pp. 541–546. With 4 figs. on 2 plates.

CHEN (W. L.) & ROSE (G.). Untersuchungen ueber die Verbreitung der Menschlichen Paragonimiasis im Talbezirk von Landin (Provinz Chekiang, Hsien Shaoshing).—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 519–524.

GRUBER (Georg B.). Zur Frage der Wurmkrankheiten. (Zu Szidat's und Wigand's "Leitfaden der einheimischen Wurmkrankheiten des Menschen.")—*Muench. Med. Woch.* 1935. May 9. Vol. 82. No. 19. pp. 733–735. [13 refs.]

KHALIL Bey [Opened by]. A Discussion on the Criteria of Cure from Bilharzia.—*Jl. Egyptian Med. Assoc.* 1935. Apr. Vol. 18. No. 4. pp. 228–231.

KHAW (O. K.). Treatment of *Schistosomiasis japonica* in Rabbits with Concentrated Fouadin. (A Preliminary Report.)—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 535–541.

KOIDZUMI (Makoto). Studies on the Toxic Actions of the Coelomic Fluid of Ascaris.—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 589–599. With 4 figs. on 3 plates. [43 refs.]

KOMIYA (Y.), KAWANA, K. & TAO (S.). Investigations into Helminthiasis among Japanese Pupils in Shanghai.—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 611–617.

KU (D. Y.). Oxyuris Infection of the Wall of the Fallopian Tube.—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 605–610. With 2 figs. on 1 plate. [11 refs.]

MALLIK (K. L. Basu). A Case of Guinea-Worm Infection.—*Indian Med. Gaz.* 1935. May. Vol. 70. No. 5. p. 264. With 1 fig.

MARTILLOTTI (F.). L'ascaridiosi nell'infanzia.—*Pediatria.* 1935. Mar. 1. Vol. 43. No. 3. pp. 321–331.

MUELLER (Justus F.). A *Diphyllobothrium* from Cats and Dogs in the Syracuse Region.—*Jl. Parasitology.* 1935. Apr. Vol. 21. No. 2. pp. 114–121. With 21 figs. [10 refs.]

OHIRA (Tokuzo). On the Active Immunization of Animals against Tape Worms.—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 601–604.

OTTO (J. H.). Clinical Pathophysiological and Therapeutical Aspects of Human Clonorchiasis.—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 543–561. [73 refs.]

OXENIUS (Kurt). Zur Behandlung des Pruritus ani bei Oxyuriasis.—*Muench. Med. Woch.* 1934. Dec. 20. Vol. 81. No. 51. pp. 1977–1978.

Rose (G.) & Koh (T. M.). Beobachtungen ueber die Fortpflanzung und die Lebensweise der Zwischenwirtschnecke (*Oncomelania hupensis*) von *Schistosoma japonicum* unter Laboratoriumsbedingungen.—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 525–533.

Scaduto (Pasquale). Alcuni animali da cortile ed i passeri quali vettori della diffusione a distanza delle uova di Ankylostoma duodenalis.—*Riv. Sanitaria Siciliana.* 1935. Apr. 15. Vol. 23. No. 8. pp. 597–600, 603–604. [14 refs.] English summary (5 lines).

Vogel (Hans). Der Entwicklungscyclus von *Opisthorchis felineus.*—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 619–624.

Young (Shutsu). The Blood Picture in Human Fasciolopsiasis (*F. buski*).—*Far Eastern Assoc. Trop. Med. Trans. Ninth Congress, Nanking, China, 1934.* Vol. 1. pp. 563–566.

MISCELLANEOUS.

Poggi (Igino). Parassiti intestinali nei bambini: rilievi statistici e note cliniche. [**Intestinal Parasites in Children (in Milan).**]—*Arch. Ital. Sci. Med. Colon.* 1935. May 1. Vol. 16. No. 5. pp. 321–349. With 1 fig. [34 refs.] English summary (2 lines).

The author examined the faeces of 1,100 children between the ages of 2 and 14 years in the South Corona Hospital, Milan, and found 614 or 56 per cent. harbouring parasites of some kind. [The method of examination is not stated; presumably it was by direct smear.] These include all forms, even those not regarded as pathogenic such as *Trichomonas intestinalis*, *Entamoeba coli*, Spirochaetes, Blastocystis and Bodo. The commonest was ova of *Trichuris trichiura* found in 298 or 27 per cent., Ascaris 158 or 14 per cent., *E. coli* 123, *Blastocystis hominis* 108, and Giardia 98. *E. histolytica* was found in 7 or 0·6 per cent., *H. nana* in 10 or 0·9 per cent. Helminthic infestations were commonest at the age of 7 years, being found in 39 of 76 children at that age; almost the same proportion, 44 out of 91 and 39 out of 78, was found at ages 6 and 10 years. Details are given of 15 patients. There is no mention of any having resided outside Milan. *H. H. S.*

Peckolt (Waldemar) & Prado (Alcides). Contribution au traitement des protozooses intestinales par le *Jacaranda decurrens* Cham. (*Bignoniaceae*). [**Treatment of Intestinal Protozoal Infections by *J. decurrens*.**]—*C. R. Soc. Biol.* 1934. Vol. 117. No. 33. pp. 719–720.

Tincture of Carobinha prepared from the South American plant *Jacaranda decurrens* Cham. has, in the authors' hands, given good results in the treatment of giardia, chilomastix and trichomonas infections and even results which may be regarded as encouraging with amoebic dysentery. The tincture has a pleasant taste and is quite non-toxic. *C. M. Wenyon.*

Balena (Alfredo). Giardiose biliar. [**Biliary Giardiasis.**]—*Brasil-Medico.* 1935. Jan. 19. Vol. 49. No. 3. pp. 47–56. With 1 chart. [11 refs.] French summary.

The study of 19 cases of giardia infection by radioscopy of the gall bladder and examination of the bile obtained by duodenal tubage has convinced the author that a condition of cholecystitis caused by the flagellates in the gall bladder exists. The symptoms are varied and may resemble those due to ulceration of the stomach, the presence of biliary or renal calculi, or cardiac disturbances as revealed by arhythmia or angina. Various lines of treatment are recommended but it is admitted that it is not easy to eradicate the parasite. The conclusion that the parasites actually inhabit the biliary passages is somewhat equivocal, for the author admits that they were not found in the gall bladder in cases which were treated surgically. [The discovery in bile obtained by duodenal tubage of a flagellate, known to live and reproduce in large numbers in the duodenum, would hardly seem to justify the assumption that it has necessarily come from the gall bladder. There appears to be a growing tendency in the literature to attribute to this flagellate serious pathogenic properties based largely on this

assumption. The records of the discovery of giardia in the gall bladder itself at the time of surgical interference are as yet far from convincing.]

C. M. W.

Fillion (H.) & Millischer (P.). La résine du *Schinus terebenthifolius* dans le traitement de la lambliase. [**Resin of** *S. terebenthifolius* **in Treatment of Giardiasis.**]—*Bull. Soc. Path. Exot.* 1935. Feb. 13. Vol. 28. No. 2. pp. 92–97.

The author claims that the product of distillation of the resin of *Schinus terebenthifolius*, a colourless essence, has a specific action on lamblia infections, when administered by the mouth in doses of 1 to 4 cc. daily in a mixture containing paregoric, syrup of tragacanth and julep. In discussion Deschiens points out that temporary disappearance of flagellates and their cysts from the stool is a common occurrence without treatment, so that care is required in drawing conclusions as to the action of any drug administered. *C. M. W.*

Grams (H.). Beitrag zur Lamblienerkrankung. [**Giardiasis.**]—*Klin. Woch.* 1934. Dec. 15. Vol. 13. No. 50. pp. 1796–1797. [13 refs.]

Sincke (G. E.). Zur Therapie der Lambliosis. Bemerkungen zur Mitteilung von H. Grams, Beitrag zur Lamblienerkrankung, in Jg. 1934, S. 1796 dieser Wochenschrift.—*Ibid.* 1935. Feb. 9. Vol. 14. No. 6. p. 204.

In the first paper 3 cases of lamblia infection are described, two of which were cured, one by a single neosalvarsan injection of 0·6 gm. and the other by duodenal lavage with magnesium sulphate and olive oil combined with neosalvarsan injection of 0·3 to 0·6 gm. The third case proved refractory to all the treatments tried.

In the second paper the author records failure to cure lamblia infections by neosalvarsan injection but success by introduction of the salvarsan solution (0·3 to 0·45 gm. in 200 cc. water) into the duodenum.

C. M. W.

Dobell (Clifford). **Researches on the Intestinal Protozoa of Monkeys and Man. VI. Experiments with the Trichomonads of Man and the Macaques.**—*Parasitology.* 1934. Oct. Vol. 26. No. 4. pp. 531–577. [44 refs.]

After a number of carefully controlled experiments with the trichomonads of man and macaques the author arrives at the general conclusion that the intestinal and vaginal trichomonads of man are not specifically distinct from one another nor from the flagellates of similar habitat in macaques. The consequence of this is that *Trichomonas vaginalis* Donné, 1837, *T. hominis* Davaine, 1860 [=*T. intestinalis* Leuckart, 1879] and *T. macacovaginae* Hegner and Ratcliffe, 1927 are synonymous. Within this species there exist diverse strains distinguishable by minor morphological characters (size, average number of anterior flagella, etc.) and physiological properties (infectivity for various hosts, ability to ingest red blood corpuscles, etc.). In these experiments a human being, the author himself, was infected with an intestinal trichomonad from a monkey, the infection produced being a typical *T. hominis* infection which has persisted for 4½ years. With

this same strain a monkey free from intestinal trichomonad infection was given a vaginal infection which has been in existence for 3½ years. [Though in no case was the author able to infect a monkey with a trichomonad of human origin, the experimental infection of man with a monkey strain, noted above, and the cross infection experiments between monkeys of different species can leave no doubt that the general conclusions drawn by the author are correct.] *C. M. W.*

Hegner (Robert) & Eskridge (Lydia). **Elimination and Cross-Infection Experiments with Trichomonads from Fowls, Rats and Man.**—*Amer. Jl. Hyg.* 1935. Jan. Vol. 21. No. 1. pp. 135–150.

A 1 per cent. carbarsone in 1 per cent. sodium bicarbonate solution given to rats in place of water will eliminate all trichomonads from the intestine in 5 days. Each rat ingested about 0·1 gm. carbarsone a day. Other protozoa (amoeba, giardia, hexamita and chilomastix) were not affected to any considerable extent. The solution administered to chicks eliminated a caecal trichomonad infection in 1 to 7 days. They could be reinfected immediately after the treatment was discontinued. Trichomonas-free rats were infected with *Trichomonas hominis* in culture, the infection lasting at least for 61 days in some cases. Clean rats became infected with rat or human trichomonads when made to associate with infected rats. *C. M. W.*

Westphal (Albert). Das Verhalten von *Trichomonas vaginalis* in der Kultur. [**Behaviour of *T. vaginalis* in Culture.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1935. Mar. Vol. 39. No. 3. pp. 106–112. With 5 text figs. [13 refs.]

By a special technique the author has succeeded in maintaining *Trichomonas vaginalis* in culture for 9 months. Compared with the intestinal *T. hominis* it exhibits structural differences which justify its retention as a distinct species. *C. M. W.*

Hegner (Robert) & Eskridge (Lydia). **Influence of Carbohydrates on Intestinal Protozoa in Vitro and in Vivo.**—*Amer. Jl. Hyg.* 1935. Jan. Vol. 21. No. 1. pp. 121–134. With 1 chart. [18 refs.]

The estimation, chiefly by a colour reaction, of the quantity of starch in 94 specimens of human faeces did not show that there existed any relation between the quantity of starch and the protozoal infections present. In cultures of *Trichomonas hominis* the flagellate growth is greatly improved by the addition of rice starch. *C. M. W.*

Brumpt (E.). Au sujet de la prétendue schizogonie régressive des gamètes femelles d'*Haemoproteus paddae*: présentation de préparations. [**The Alleged Regressive Schizogony of Female Gametes of *H. paddae*.**]—*Bull. Soc. Path. Exot.* 1935. Mar. 13. Vol. 28. No. 3. pp. 144–154. With 8 figs. [30 refs.]

In this illustrated article the author discusses the references which have been made in the literature to the subject of the possible schizogony of the female gametocytes of halteridium of birds. He shows conclusively that a failure to recognize the existence of double infections of plasmodium and haemoproteus, and the apparent fusion in the red

blood corpuscle of a number of parasites when multiple infections occur, are responsible for the opinion that schizogony of gametocytes may take place. *C. M. W.*

MAGATH (Thomas Byrd). **The Coccidia of Man.**—*Amer. Jl. Trop. Med.* 1935. Mar. Vol. 15. No. 2. pp. 91–129. With 3 figs. [129 refs.]

In this lengthy discussion of the subject of coccidiosis in man it is pointed out that there is no proof that any species of *Eimeria* inhabits the body of man as a parasite. Of the *Isospora* there is one species, which the author argues (in the reviewer's opinion fallaciously) should be known by the name *Isospora hominis* Fantham, 1917. Owing to the low incidence of infection with this parasite, which is not adequately separated, in the author's opinion, from the similar parasites of cats and dogs, the suggestion is made that some reservoir host may exist. A list is given of all the previous records of *I. hominis* infection, with a new one from the territory of Hawaii. The question of the nomenclature of this parasite is admittedly involved and it is not clear that the author's arguments solve the difficulties associated with it.

C. M. W.

METELKIN (A.). **The Rôle of Flies in the Spread of Coccidiosis in Animals and Men.**—*Med. Parasit. & Parasitic Dis.* Moscow. 1935. Vol. 4. Nos. 1–2. [In Russian. pp. 75–82. English summary p. 82.]

The author carried out a number of experiments with a view to establishing the possible epidemiological rôle played by flies in the dissemination of coccidial infection. Various laboratory-bred and "wild" flies (*Musca domestica, Calliphora erythrocephala, Lucilia caesar, Cynomyia mortuorum, Stomoxys calcitrans* and *Phormia groenlandica*) were fed on the faecal suspensions of rabbits containing coccidial oöcysts. These were subsequently examined in the droppings and oral discharges. It was found that all the flies were capable of ingesting the oöcysts, which remained unaltered and viable in the intestinal contents up to 24 hours, and in the discharges until the latter dried up. Oöcysts were also recovered from the external parts of the body of the insects. The viability of the oöcysts was tested by the eosin-staining reaction and by their capacity to sporulate in a solution of potassium bichromate. The length of time during which the oöcysts remain viable in the gut of the flies, the rate at which these discharge the intestinal contents and the range of their flight (700 metres in the case of the house-fly), are all epidemiological factors suggesting that these insects play an important rôle in the mechanical transmission of coccidioses. *C. A. Hoare.*

TAYLOR (Frank H.). **A Check List of the Culicidae of the Australian Region.**—*Commonwealth of Australia Dept. of Health, Service Publication (School of Public Health & Trop. Med.) No. 1.* 1934. May 25. 24 pp. With 1 folding map.

The list enumerates the mosquitoes, including *Dixa, Chaoborus*, etc., known to occur in Australia and New Zealand and in the islands from the Celebes and Moluccas on the west to the Marquesas on the east.

The pamphlet is interleaved with plain paper and includes a map of the region.

The list is based on EDWARDS' Culicidae in "Genera Insectorum," but the information on geographical distribution is much more complete and thoroughly up-to-date. There is one error which is of considerable medical importance and to which attention must be called. The author (apparently copying EDWARDS) includes New Caledonia in the range of *Anopheles punctulatus*. We can find no evidence for the insect occurring there either in collections in this country or in the papers to which the author refers in his bibliography.* We think that the mosquitoes of New Caledonia are fairly well known and believe that the island is free of Anopheles and of indigenous malaria.

P. A. Buxton.

LI (Feng-swen) & WU (Shih-cheng). **The Mosquitoes of Hangchow, Chekiang.**—Year Book No. 3, Bur. Entom., Hangchow (1933). 1934. pp. 97–123. With 3 plates.

According to the authors of this compilation, twenty-seven species of mosquitoes, including four anophelines (*Anopheles aitkeni*, *A. hyrcanus* var *sinensis*, *A. lindesayi* and *A. minimus*) have been met with at Hangchow. Included in this total, however, is *Aëdes scutellaris*, as to which the present reviewer is informed by Dr. F. W. EDWARDS that Messrs. Li and Wu are in error, since that species "is not known to occur in China, and almost certainly is not to be found there."

In the present publication, which should be locally useful, brief diagnostic characters and notes on distribution are given for each species mentioned, with in addition, where such records exist, data as regards "Sanitary importance." *E. E. Austen.*

HANCOCK (G. L. R.). **The Mosquitoes of Namanve Swamp, Uganda. With an Appendix on the Estimation of Organic Carbon in Waters** by G. GRIFFITH.—*Jl. Animal Ecology*. 1934. Nov. Vol. 3. No. 2. pp. 204–221. With 4 figs. on 3 plates. [11 refs.]

The paper sets out observations, both biological and physico-chemical, on the mosquito larvae which occur in and about a large swamp containing papyrus.

The problem which the author has undertaken is an extremely complex one, for in a period of one year he discovered 35 species of mosquito in his swamp and he refers them to eight types of habitat. He is able also to contrast the fauna of his swamp with that of forest pools. The physico-chemical factors were not studied at regular intervals, but a considerable number of observations are recorded. In spite of the fact that the swamp is permanent, it is interesting to observe that the numbers of certain species show marked seasonal prevalence. For instance, there was an increase of larvae of *Anopheles gambiae* after rain. In the author's view, the numbers of these were reduced during the dry season owing to the higher organic content of the water. When the rain fell and diluted the water, it became more suitable to larvae of this insect. It seems that more rapid progress in our understanding of the ecology of mosquitoes might be made if workers would test their ideas experimentally.

* In a letter recently received Mr. Taylor agrees that this is so.

The paper concludes with a note by G. Griffith, describing a method for estimating organic carbon in water. The method can be applied to the water sample itself, and not to the residue left after evaporation. *P. A. Buxton.*

Dove (W. E.) & Hall (D. G.). **Dikes and Automatic Tide Gates in Control of Sand Flies and Salt Marsh Mosquitoes.** [Abstract.]—*Jl. Parasitology.* 1934. Dec. Vol. 20. No. 6. pp. 337–338.

"Sandfly and salt marsh mosquito breeding places are being eliminated at Savannah, Georgia, by the use of dikes fitted with automatic tide gates. The gates close to prevent tidal waters from entering the diked areas but open to permit surface drainage of these areas. In Chatham county where 36 principal breeding places were eliminated by dikes and automatic gates, there has been a marked reduction in the population of both sandflies and salt marsh mosquitoes. Isolations of sandfly larvae from soil samples and the sandflies emerging in field cages show that actual drying of the breeding places either destroys sandfly larvae or concentrates them in the wet soil of the ditches. Observations on the populations of both sandflies and salt-marsh mosquitoes suggest a reduction of 60 per cent. to 75 per cent. of the numbers usually encountered in this county. In view of the fact that only about 30 per cent. of the work is completed in Chatham county, the results suggest a high degree of control."

Rev. Hort. Agric. Afr. N. Algiers. 1934. Sept. Vol. 38. No. 9. p. 250.—La destruction des moustiques par les cactus épineux. [**Mosquito Control by Prickly Pear.**]—[Summarized in *Rev. Applied Entom.* Ser. B. 1934. Dec. Vol. 22. Pt. 12. p. 233.]

"Good results in mosquito control have been obtained by means of a mucilaginous mixture made by steeping in water the chopped leaves of prickly-pear (*Opuntia vulgaris*). The mixture floats on the surface of pools and gradually obstructs the tracheae of the larvae, killing them in from 15 to 50 hours. Further, the adult mosquitos seldom oviposit on the water, and if they do, the eggs cannot develop. If the leaves are not steeped but are merely cut up and thrown into the water, the result is the same though slower. This treatment has been found as effective as oiling, and has the advantage of not affecting fish."

Okounevski (J.) & Khakhaieva (V.). La volatilité et évaporabilité des désin[s]ectants. [**The Volatility and Rate of Evaporation of Insecticides.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1934. Vol. 3. No. 1. pp. 82–91. [In Russian. French summary p. 91.]

The authors have studied some of the physical properties of a number of insecticides from the point of view of their practical application. Their efficiency depends upon the lethal concentration of the chemical and upon the rate at which it is capable of producing the required concentration. This is determined by the volatility and rate of evaporation of the substance in question. These properties were examined in various insecticides and it was found that the most suitable substances for use at room temperature are carbon tetrachloride and benzene, since they possess a high degree of volatility and a low boiling point (below 120°C.). On the other hand, substances with a higher boiling point (120–180°C.) and a medium rate of evaporation, such as the xylols and solvent naphtha, can only be utilized at very high temperatures. *C. A. Hoare.*

Campbell (F. L.), Sullivan (W. N.), Smith (L. E.) & Haller (H. L.). **Insecticidal Tests of Synthetic Organic Compounds—Chiefly Tests of Sulfur Compounds against Culicine Mosquito Larvae.**—*Jl. Econom. Entom.* 1934. Dec. Vol. 27. No. 6. pp. 1176–1185.

The object of this work was to test a number of synthetic compounds —chiefly sulphur compounds—for insecticidal powers. Culicine larvae were considered a convenient material for the preliminary testing, but use against other insects including terrestrial forms is also contemplated. The substances were applied in the form of extremely dilute solutions, often more nearly suspensions since the substances were of very low solubility. Sixty-eight compounds, mostly solids, were tried in all.

Larvicidal activity was tested against *Culex pipiens*, L., *C. territans* Walk., and *C. quinquefasciatus* Say., in Erlenmayer flasks containing 100 cc. distilled water and 50 or 100 3rd or 4th instar larvae at a standard temperature ($29{\cdot}3 \pm 0{\cdot}1$). The compounds were rejected if less effective than nicotine, that is if killing less than 65 per cent. in 8 hours at a dilution of 1 : 10,000. Twenty-four of the compounds—benzo-thiazoles, disulphides, sulphides, thioethers and thiophenols—were further studied, but 11 further were rejected as not killing 50 per cent. overnight at 1 : 40,000. The most active substances were tested again at dilutions of 1 : 100,000 and 1 : 200,000. The order of activity is not necessarily the same at all dilutions.

Replacement of sulphur in the molecule by oxygen in general resulted in formation of a substance inactive at 1 : 40,000 ; diphenylene oxide was a noteworthy exception, being slightly more toxic than diphenylene sulphide. These substances were the most toxic, killing nearly 100 per cent. of the larvae in 5 hours at 1 : 200,000. (In an addendum it is noted that thiodiphenylamine (phenothiazine) is even more toxic, functioning at 1 : 1,000,000.)

Larvicidal activity against Culex was found to be no criterion of activity against other insects. Several examples of anomalies are given. *D. R. P. Murray.*

Nieschulz (Otto) & Du Toit (René M.). **Handling Mosquitoes for Experimental Purposes under South African Conditions.**—*Onderstepoort Jl. Vet. Sci. & Animal Industry.* 1934. July. Vol. 3. No. 1. pp. 79–95. With 5 figs.

Though primarily interesting to veterinarians, this paper contains information of value to all who require to keep mosquitoes alive, especially in dry climates where day temperatures reach a high level.

Throughout work on mosquitoes as vectors of horsesickness and blue-tongue in sheep, the chief difficulty was the maintenance of humidity high enough to suit the insects. With this end in view, the mosquitoes were kept either in small jars covered with mosquito netting, or in cages similarly enclosed. The former " were placed on wet cotton wool in slightly larger jars provided with loosely fitting lids." The wooden tops of the cages were protected by galvanized iron, and tops and sides were draped in a hessian cover, wetted by a constant flow of water. Before being required for use, the mosquitoes (*Aëdes* spp.) were fed by large balls of cotton wool saturated in a 10 per cent. solution of sugar water, encased in mosquito netting, hung from the roofs of the cages,

and changed and sterilized on alternate days to prevent moulds. Ingenious arrangements for feeding the mosquitoes on animals are described. *E. E. Austen.*

Buckner (James F.). **An Improved Technique for mounting Mosquito Larvae.**—*Amer. Jl. Trop. Med.* 1934. Sept. Vol. 14. No. 5. pp. 489–491.

Instead of the customary, but distorting and damaging method of immersion in hot water, it is recommended that mosquito larvae for mounting be subjected to a somewhat lingering (four hours for siphonate, two hours for asiphonate larvae) death in 2 per cent. cocaine hydrochloride solution. The methods of preliminary cleansing in 1·5 per cent. magnesium sulphate solution, and subsequent preparation for mounting are described. For the composition of cells in which to mount specimens in any desired medium the following formula is given.

	Grams.
Beeswax	25
Paraffin (melting point 60° to 62°C.)	10
Gum mastic	6
Prepared chalk	2
Vermilion (for colour)	4

The gum mastic is to be powdered, mixed with the last two ingredients, and the mixture added to the first two after the latter have been melted. The whole should then be allowed to simmer and be stirred for fifteen minutes.

It is claimed that cells so composed will withstand extremes of heat and cold. *E. E. A.*

Weyer (Fritz.) Der Einfluss der Larvalernährung auf die Fortpflanzungsphysiologie verschiedener Stechmücken. [**The Influence of the Nutrition of the Larvae on the Reproductive Physiology of Certain Mosquitoes.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1934. Sept. Vol. 38. No. 9. pp. 394–398.

The paper describes experiments the purpose of which is to discover whether the food which is given to mosquito larvae has much effect on the biology of the adults, and in particular on their reproductive powers.

The author describes experiments in which larvae of *Culex pipiens* were fed on different diets including powdered liver. On this the larvae grew rapidly and produced vigorous adults, which laid a large number of eggs autogenously. But the larvae of the second generation tended to die and produced very weak adults, in many of which the ovaries failed to develop completely. [It is not clear whether this result was obtained consistently or once.] In similar experiments with *C. fatigans* and *Aëdes aegypti*, it was found that the powdered liver gave rise to large vigorous adults, and in a few instances in *A. aegypti* the eggs began to mature without the female receiving a blood meal. The author then applied the same method to *Anopheles maculipennis* of the races *atroparvus* and *messeae*. In *messeae* he observed a commencement of ovarian development in females which had not fed on blood: [this is interesting if it implies that these insects are tending to become autogenous; but if the females had developed from larvae fed on hay

infusion, is it certain that no development of the ovaries would have been observed ?] It was also found that male *messeae* suffered from a zoospermia if they had been bred from larvae fed on liver : the development of the sperm in wild males is quite different, and it seems possible that this explains the fact that this race fails to breed in captivity. *P. A. Buxton.*

Silverthorne (Nelles) & Brown (Alan). **Cutaneous Myiasis in Infants.**—*Arch. Dis. in Childhood.* 1934. Dec. Vol. 9. No. 54. pp. 339–342. With 3 figs.

Three cases of cutaneous myiasis produced by the larvae of *Wohlfahrtia vigil* (Walk.) are reported. The lesions occurred in healthy infants sleeping out of doors in June in Montreal. Several references are given to similar cases reported from Canada [see this *Bulletin*, Vol. 30, p. 310]. *A. G. B.*

Aubertin (D.) & Buxton (P. A.). *Cochliomyia* **and Myiasis in Tropical America.**—*Ann. Trop. Med. & Parasit.* 1934. Oct. 19. Vol. 28. No. 3. pp. 245–254. With 1 plate. [26 refs.]

Cushing and Patton [this *Bulletin*, Vol. 31, p. 359], writing on " the Screw-Worm Fly of the New World," showed that this well-known cause of myiasis in man and animals had been wrongly identified as *Cochliomyia macellaria* and, believing the species to be then undescribed, they proposed to term it *C. americana*. This designation, however, as pointed out by the reviewer, is synonymous with *C.* (*Lucilia*) *hominivorax*, Coq., which dates from 1858 and, in default of proof of any earlier title, must be accepted as the true name of the Screw-Worm Fly.

The present contribution, after dealing in some detail with " Systematics," discusses *C. hominivorax* under the headings " Biology," " Geographical Distribution " and " Pathology." It is probable that the fly, which is believed to be " specifically parasitic " in the larval stage, deposits from 150 to perhaps 300 eggs at one time. Its distribution, like that of the true, non-parasitic, saprophagous *C. macellaria*, extends from the southern United States, through Central America and the West Indies, to the Argentine. In the five years 1928 to 1932 there were treated in public hospitals in British Honduras, British Guiana and Trinidad (with Tobago) 179 cases of myiasis, the majority of which, though perhaps not all, were probably due to *C. hominivorax*. Fifteen of these cases ended fatally, giving a case mortality of 8 per cent. *E. E. Austen.*

Stewart (M. A.) & Boyd (A. N.). **A New Treatment of Traumatic Dermal Myiasis.**—*Jl. Amer. Med. Assoc.* 1934. Aug. 11. Vol. 103. No. 6. p. 402.

Traumatic dermal myiasis is defined as the invasion of wounds or skin ulcers by dipterous larvae. For treatment is advised chloroform in light vegetable oil.

The usual treatment for this condition in U.S.A. is irrigation with 20 per cent. chloroform in sweet cow's milk. This has to be made up fresh on each occasion and two to four treatments are usually needed. The authors find that light vegetable oil is a more satisfactory vehicle or diluent of the chloroform, for in this chloroform is entirely soluble.

If in a closed container the solution will keep indefinitely and the oil has a soothing effect on the wound : 15 per cent. of chloroform is a sufficient proportion. Seventeen cases were treated either by submersion for 30 minutes or by constant irrigation or keeping a flat gauze dressing saturated for the same period. In each case all the larvae were removed in a single treatment. In 13 of these, flies raised from the maggots were *Cochliomyia macellaria* Fabr. [See above.] *A. G. B.*

von Szentkirályi (Siegmund). Ueber eine durch Goldaugenlarven verursachte Hautveränderung. [**A Skin Reaction caused by Lacewing-Fly Larvae.**]—*Dermat. Woch.* 1934. Nov. 17. Vol. 99. No. 46. pp. 1502–1504. With 2 figs.

On two occasions in July 1934, in his garden in Hungary, the author was bitten by a lacewing-fly (*Chrysopa*) larva, once on the back of the hand and once on the arm. The bites resulted in a string of small, tense, red, itching vesicles, which persisted for four or five days and disappeared without treatment. Similar cases were repeatedly seen by the author in the course of practice, and he is convinced that they are not uncommon in June and July, when children playing in gardens are especially liable to be bitten, although the results are usually ascribed to ants or mosquitoes. Lacewing-fly larvae feed on the juices of aphids, but do not suck vertebrate blood ; the punctures occasionally made by their sucking-spears in human skin would seem to be experimental. [Similarly robber-flies (Asilidae), normally predators of other insects, have been known to inflict bites on man.] *E. E. Austen.*

Yatsenko (F.), Paretskaya (M.) & Kipritch (S.). [**A Case of Myiasis of the Urethra.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1934. Vol. 3. No. 4. [In Russian p. 348.]

The authors report a case of a boy, 6 years old, passing maggots in his urine, some of which were actually seen protruding from the urethra. The larvae were identified as belonging to *Musca domestica*.

C. A. Hoare.

Evans (A. C.). **Studies on the Influence of the Environment on the Sheep Blow-Fly *Lucilia sericata* Meig. I. The Influence of Humidity and Temperature on the Egg.**—*Parasitology.* 1934. Aug. Vol. 26. No. 3. pp. 366–377. With 8 figs. [11 refs.]

Lucilia sericata has a very wide distribution in temperate and subtemperate countries, and in many parts of its range it causes myiasis of sheep. What climatic factors limit its distribution and abundance ?

The paper is the first of a series of articles in which the author proposes to discuss the effect of climatic factors upon successive stages of *Lucilia sericata*. The principal value of the paper is, therefore, to veterinary entomologists, though the author's conclusions may be briefly mentioned here. He finds that drier air retards the development of the egg, and that this effect is due to loss of water. The process is irreversible, and the egg cannot absorb moisture from a saturated atmosphere nor if it is covered with water. The author has also mapped those combinations of temperature and humidity which are fatal or favourable to the egg. *P. A. Buxton.*

STEWART (M. A.). **The Rôle of *Lucilia sericata* Meig. Larvae in Osteomyelitis Wounds.**—*Ann. Trop. Med. & Parasit.* 1934. Dec. 20. Vol. 28. No. 4. pp. 445–460. [23 refs.]

A number of factors are responsible for the beneficial action of maggots in the treatment of osteomyelitis. The maggots must be used with care because, though preferring necrotic tissue, they will attack healthy tissues.

All observers are agreed upon the beneficial effect of larvae of *Lucilia sericata* and other blow-flies in chronic osteomyelitis. The author discusses the vexed question of the nature of this action. From his own observations and those of others he concludes that many factors are at work. By means of their lacerating mouth-hooks and excreted tryptase, they destroy and ingest necrotic tissue; most of the ingested bacteria are killed in the acid region of their mid-intestine which has a pH of 3·0–3·5; the wound is rendered alkaline by ammonia and calcium carbonate excreted by the larvae; the calcium ions are believed to stimulate phagocytosis, and perhaps both the calcium and the alkalinity promote the growth of healthy granulation tissue; and, finally, the bacterial exotoxin is thought to be rendered inert by the acidity in the mid-intestine of the larva. No bacteriophage has been found in the maggots. Experiments on guineapigs showed that all races of *L. sericata* investigated can establish themselves in and destroy healthy tissue; though given the choice they usually settle in wounds containing dead matter. The destruction of living tissues has been observed also in clinical cases; and the author showed in experiments on himself that the maggots can penetrate the healthy skin of the arm. For therapeutic purposes they must, therefore, be used with care if a destructive myiasis is to be avoided. *V. B. Wigglesworth.*

DUNN (Lawrence H.). **Prevalence and Importance of the Tropical Warble Fly, *Dermatobia hominis* Linn., in Panama.**—*Jl. Parasitology.* 1934. June. Vol. 20. No. 4. pp. 219–226.

In Panama, subcutaneous myiasis in man caused by the "gusano de monte," *i.e.*, the larvae of *D. hominis* (this *Bulletin* Vol. 31, p. 63), has been recognized for eighty years at least, but has doubtless existed for centuries, albeit the Report of the Governor of the Panama Canal for 1928 speaks of two separate introductions of the maggot, in cattle from Venezuela and from Nicaragua. Surveying expeditions which preceded the construction of the Canal suffered severely from this form of myiasis, which is prevalent in the humid and low-lying as also in the forested regions of Panama, and from which no area of the body, whether clothed or not, from the eyelids to the middle of the back, is apparently exempt. In children the head and neck seem to be affected more often than other regions, and at least one case (in an infant 1½ years old) of the penetration of a larva of *D. hominis* through the anterior fontanelle into the brain, with fatal results, is on record. From personal experience, summarized previously (*loc. cit.*), the author considers the newly-hatched larva capable of penetrating drill clothing; but, difficult as it doubtless often is to explain the presence of the maggot in a particular spot, its capacity to pass through an unbroken, closely woven fabric needs to be demonstrated.

While a white man may harbour several of these parasites at the same time, and a native, although in no way immune, usually a

smaller number, cattle are much more severely attacked, sometimes to the extent of having " thousands of the warbles in their skin." In 1928, among cattle belonging to the Supply Department of the Canal, 900 head are said to have died and some 3,000 more to have been rendered unfit for slaughter as a result of the prevalence of warbles. Similar losses, though on a smaller scale, occurred in the following year, and in consequence the system of pasturing cattle in the Canal Zone was to a large extent abandoned.

In addition to human beings and cattle, the victims of *D. hominis* include sheep, dogs, cats, rabbits, and various species of wild animals, such as monkeys and agoutis (*Dasyprocta*).

[With so extensive a list of hosts, the abundance of this insect in Panama and other parts of Tropical America, and the frequency with which it parasitizes man are not surprising. Control would seem to be out of the question, and repellents (in this case against various species of Diptera forced by Dermatobia to act as porters for its eggs) have but a limited and temporary value in hot countries.] *E. E. Austen.*

i. Meleney (Henry E.) & Harwood (Paul D.). **Human Intestinal Myiasis due to the Larvae of the Soldier Fly,** *Hermetia illucens* **Linné (Diptera, Stratiomyidae).**—*Amer. Jl. Trop. Med.* 1935. Jan. Vol. 15. No. 1. pp. 45–49. With 2 figs.

ii. Schwetz (J.). Sur un cas de myiase intestinale provoquée par les larves de *Chrysomyia putoria*, Wied. [**Intestinal Myiasis caused by Larvae of** *Chrysomyia putoria*.]—*Ann. Soc. Belge de Méd. Trop.* 1934. Dec. 31. Vol. 14. No. 4. pp. 469–471.

i. In October, 1933, some fifty larvae of *Hermetia illucens*, a fly which breeds normally in decaying vegetable and animal matter, and occurs in North and South America as also in Samoa, were passed at Nashville, Tennessee, by a white boy aged ten. Before expulsion, the larvae " caused symptoms of local irritation in the stomach and rectum, and spells of fainting," and their presence in the patient's intestine is presumed to have been a result of " eating raw fruit or vegetables on which the eggs of the fly had been deposited." Only one similar case of parasitization by larvae of *H. illucens* is believed to be on record. [Should the present instance find its way into text books, it is to be hoped that the spurious vernacular name " soldier fly," which, if used at all, can only be applied to the entire family Stratiomyiidae, will be omitted.]

ii. More than one hundred larvae of *C. putoria*, nearly all in very young stages, were passed at stool by a European in Stanleyville, Belgian Congo. There were no morbid symptoms, and, although evidence is lacking, the infestation was probably acquired with food. Six of the larvae were reared, and Patton, who determined the species, states that he has " never heard of this fly from intestinal myiasis before." [This widely distributed tropical African species—a " greenbottle " fly some 9 mm. in length—usually breeds in carrion, cow-dung and latrines. Its larvae in at least one instance (at Lorenzo Marques) have been found in sores.] *E. E. A.*

Bouvier (G.) & van Slype (W.). Pseudo-myiase rampante. [**Creeping Pseudo-Myiasis.**]—*Ann. Soc. Belge de Méd. Trop.* 1934. Dec. 31. Vol. 14. No. 4. pp. 409–411.

A case with linear lesions on the foot with much itching ; subcutaneous tunnels with vesicles ; cause not found. Condition considered to be the

same as the larbisch of Senegal and other parts of the West Coast, but hitherto not recorded from Belgian Congo [see this *Bulletin*, Vol. 29, p. 277.] *A. G. B.*

JANISCH (Ernst). Ueber die Vermehrung der Bettwanze *Cimex lectularius* in verschiedenen Temperaturen. (Beobachtungen bei der Aufzucht von Bettwanzen II.). [**Multiplication of *C. lectularius* at Various Temperatures.**]—*Ztschr. f. Parasitenk.* 1935. Mar. 21. Vol. 7. No. 4. pp. 408–439. With 18 figs. [10 refs.]

The author gives a large mass of numerical fact relating to the reproduction and death of bedbugs (*Cimex lectularius*) kept under a variety of conditions of temperature, feeding, etc. Such information as this is valuable because it produces a better understanding of the growth of bug populations.

The author's general method was to isolate pairs of adults at a standard humidity of 75 per cent. and a number of different temperatures. Eggs and deaths were booked daily, also the hatching of eggs and the growth of larvae. Among a number of different subjects to which attention was given, the author studied the effect of the increasing age of the female on her powers of reproduction : towards the end of life a high proportion of the eggs which were laid failed to develop. He also exposed larvae to rather high temperatures, and investigated the effect of this upon the reproductive powers of the adult insect later in life. The author also studied the effect of keeping bugs continuously at 34°C. ; at this temperature several generations follow one another, but the insect eventually dies out. The following figures, extracted from many others, are surely interesting :—

27°C.	mean no. of eggs	318, 293	viable.
32	,, ,,	119, 88	,,
34	,, ,,	88, 67	,,

These facts are consistent with the observations of MELLANBY, quoted below, who shows that 34°C. is the highest temperature at which eggs can develop if the exposure is continuous.

We are grateful to the author for showing how inconsistent the results are if different individual insects are treated in a way which is believed to be identical. But many of the experiments are presented almost in the original form so that it is difficult to grasp what conclusion may justly be drawn from them. No tests of significance in the statistical sense appear to have been applied, so that one cannot always distinguish the results which may justly be attributed to the experimental conditions from those which are due to the inherent variability of the insect. *P. A. Buxton.*

MELLANBY (Kenneth). **A Comparison of the Physiology of the Two Species of Bed-Bug which attack Man.**—*Parasitology.* 1935. Feb. Vol. 27. No. 1. pp. 111–122. With 3 figs. (1 map.)

The author endeavours to discover by controlled laboratory experiments why it is that two species of bedbug so similar in shape and size inhabit two rather different climatic zones. Is it possible to discover whether the tropical species tolerates a higher temperature or breeds more rapidly at higher temperatures than the species found in temperate countries ?

The author confines himself to the study of temperature and humidity over a very wide range of conditions. He finds that humidity has very

little effect on bugs provided they are fed sufficiently frequently : the drier the air the more rapidly they lose water, but they can make up the loss at their next meal. But starving bugs live much longer in moist than in dry air. The two species are similar in this respect, and in the rate at which they lose water into atmospheres of different relative humidities. As to the upper temperature limit, it is identical for the two species, the lowest temperature which kills all bugs on an hour's exposure being 44°C. and on a 24 hours' exposure 40°C. The limit for eggs is 1° higher for both species. But at the lower end of the temperature scale there is a significant difference between the species, for the developmental zero for the egg of *Cimex lectularius* is 13°C., for *rotundatus* 15°C. It was also found that at temperatures below 30°C. the egg of *lectularius* develops more rapidly and the larva also becomes adult more rapidly, so that this species is the more efficient multiplier at those temperatures. Above 30°C. there is very little difference between the two species.

The author then passes on to consider the geographical distribution of the two bugs, and finds that *C. rotundatus* is confined to a belt which only extends outside the geographical tropics in a few places. *C. lectularius*, on the other hand, is very widely distributed in the temperate zones, passing within the Arctic circle in Scandinavia. But within the tropics it has become established in a number of places, where it seems able to exist just as well as the tropical bug. It seems, therefore, that there is a good fit between the facts of geographical distribution and the results of laboratory experiments. *P. A. B.*

Ohmori (N.). **Experimental Studies on the Influence of Low Temperatures upon the Tropical Bed-Bug (*Cimex hemipterus* Fabricius). First Report.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1934. Oct. Vol. 33. No. 10 (355). [In Japanese pp. 1511–1527. With 2 charts. [91 refs.] English summary pp. 139–140.]

The paper describes the distribution of the tropical bedbug in Formosa, Japan and Korea, and endeavours to explain it by considering winter temperature as a possible limiting factor.

It has been observed that the tropical bedbug, *Cimex hemipterus*, is common in Formosa, which has a tropical climate. It cannot be found in Japan, and this might be attributed to low winter temperature acting as a limiting factor. But the occurrence of the insect in Korea is not easy to explain at first sight.

The author's experiments show that eggs of this insect can live without developing for many weeks at 9°C. If such eggs are subsequently removed to 15°C., they develop and hatch. The larvae are capable of moulting at 10°C. but not at 9°C., the adults and larvae living many weeks at these temperatures. The view is expressed that such observations as these explain the absence of the insect from Japan, where the houses are only very slightly heated in winter ; it can exist in Korea because the domestic heating is more thorough though the winter temperatures are low. [The interest of the work would be increased if the author could give facts about the temperature in houses of different types at different times of year, comparing his observations with shade temperature outside.] *P. A. B.*

AFRICA (Candido M.). **Three Cases of Poisonous Insect Bite involving *Triatoma rubrofasciata*.**—*Philippine Jl. Sci.* 1934. Feb. Vol. 53. No. 2. pp. 169–177. With 1 plate.

The author describes the clinical symptoms observed in three patients in the Philippines who appear to have been bitten by the Reduviid bug, *Triatoma rubrofasciata*.

Each patient was seen by a medical man, and full clinical notes are published. Briefly, they suffered from local pain and itching, followed by widespread numbness, rigors and oedema of several parts distant from the bite. This was followed by rapid recovery. In each instance the patient secured an example of this bug and was convinced that that was the cause of the trouble; the possibility remains that some error in identification took place, for such cases of poisoning are surprisingly rare in view of the insect's very wide distribution and abundance in many parts of the Oriental region. Moreover, as the author points out, several writers have experienced the bite and found that the effect was negligible. The author suggests that the grave symptoms may be caused by the injection of saliva into a blood vessel rather than into subcutaneous tissues; it should not be difficult to put this to experimental proof. *P. A. B.*

FROES (Heitor P.). Dermatite à coléoptères vésicants. Nouvelles expériences et observations sur les léoptères vésicants du genre Paederus (Staphylinidae). [**Beetle Dermatitis.**]—*Arch. Ital. Sci. Med. Colon.* 1934. July 1. Vol. 15. No. 7. pp. 481–488. With 2 figs. English summary (4 lines).

The author's experiments were made in Brazil with a species of Paederus determined to be *P. brasiliensis*. They are detailed at some length and showed that the blistering fluid occurs throughout the body of the beetle and is extruded only when the creature is crushed or pressed strongly against the skin. *A. G. B.*

HINMAN (E. Harold) & KAMPMEIER (R. H.). **Intestinal Acariasis due to *Tyroglyphus longior* Gervais.**—*Amer. Jl. Trop. Med.* 1934. July. Vol. 14. No. 4. pp. 355–362. With 1 fig. [13 refs.]

The authors give an account of mite infestations in man which have caused either a rash, or urinary symptoms, or diarrhoea. They describe briefly two cases of infestation with *Tyroglyphus longior*, in one of which there was diarrhoea and the proctoscope revealed minute scattered ulcers, negative for amoebae. Looseness of the bowel had been recurrent in this man. Treatment was withheld and after six days the mites disappeared and the stools became formed. This patient died of pneumonia and there was found congestion of the mucosa of the large gut with numerous small ulcers.

In experiments to determine whether *T. longior* fed to dogs would produce diarrhoea they failed to do so. Following HASE the authors question whether the intestinal disturbance is an allergic reaction or is due to toxins liberated from the mites; they suggest that the spines on these arthropods might injure the villi.

[According to MÖNNIG (Veterinary Helminthology and Entomology: Baillière, Tindall & Cox, 1934)—

" Höve and Fiedler report several cases of sudden deaths in horses and pigs which showed at autopsy a slight enteritis, and the presence

of the meal-mite *Aleurobius farinae*, in scrapings of the intestinal mucosa. No other explanation for the deaths of the animals could be found. The mites were also present in the grain supply from which the animals had been fed."] *A. G. B.*

DAVIES (J. Rodyn). [**The "Chigoe Flea."**] [Correspondence.]—*East African Med. Jl.* 1935. Feb. Vol. 11. No. 11. p. 367.

With reference to the introduction of the chigoe flea to Abyssinia which NEGELSBACH assigns to a date between 1920 and 1924 [see this *Bulletin*, Vol. 31, p. 735] Davies writes that about the period 1924–26 the natives in S. Abyssinia called the insect Moyale, associating this place with its first appearance. He suggests that Moyale was reached via Marsabit and Meru and that the chigoe reached Abyssinia by way of the Northern Frontier Province of Kenya.

A. G. B.

LOW (G. Carmichael) & CORDINER (G. R. Mather). **A Case of *Porocephalus* Infection in a West African Negro.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1935. Mar. 8. Vol. 28. No. 5. pp. 535–537. With 1 plate.

Infections with the cysts of *Porocephalus armillatus* have been described from Tropical Africa [see Vol. 1 of this *Bulletin*, p. 405]. They have in every case been found post-mortem. Here they were shown up by X-rays in a negro in London as "calcified opacities" in the liver and other parts of the abdomen. Some of these shadows showed clearly the curved or spiral appearance taken up by the nymphal forms within the cyst. *A. G. B.*

PAVLOVSKY (E. N.) & STEIN (A. K.). [**The Action of Scolopendra Venom upon Human Skin. II.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1935. Vol. 4. No. 1–2. [In Russian pp. 88–90.]

Working in the Crimea, the authors carried out 20 experiments upon the effect of the venom of *Scolopendra cingulata* upon human skin. The isolated poison glands of several score myriapods were dried, emulsified in saline, and left to stand overnight, after which the clear fluid was injected intradermally. The injection provokes an acute local inflammatory reaction which increases up to the fourth or fifth hour after the inoculation, and is characterized by acute pain, oedema and the formation of a papule. The latter may persist up to four days, after which it is absorbed. The reaction observed under experimental conditions is similar to that produced by the bite of the myriapod. The drying of the glands does not effect the toxic properties of the venom which are retained for more than 15 months.

C. A. Hoare.

i. KELLAWAY (C. H.). **A Note on the Venom of the Sydney Funnel-Web Spider, *Atrax robustus*.**—*Med. Jl. Australia.* 1934. May 26. 21st Year. Vol. 1. No. 21. pp. 678–679.

ii. MACKERRAS (I. M.). **The Venom of *Atrax robustus* Cambridge.** [Correspondence.]—*Ibid.* June 16. No. 24. p. 794.

i. The author finds that though the bite of *Atrax robustus* is deadly to man, four fatalities being recorded and several instances of extremely

severe symptoms, he was unable to produce symptoms in rabbits, guineapigs or mice which were bitten or injected with venom. The spiders were six fine specimens, kept in captivity. The experimental animals, he suggests, may have been immune to the venom, or the venom was reduced in potency, or the symptoms in man are due to acute anaphylactic shock in sensitive individuals, or are due to a potent bacteria-produced toxin not invariably present in the venom; he is inclined towards the first of these hypotheses.

ii. In an interesting letter the writer says that in his own experiments with this species three guineapigs were bitten. Two showed no ill-effects and one died, but it was in an enfeebled state.

A. G. B.

MARZINOVSKY (E.). [**The Clinical Aspects of** *Lathrodectes* **Bite.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1934. Vol. 3. No. 4. [In Russian pp. 342–348. With 5 figs.]

A detailed account is given of the clinical course of three cases of persons bitten by the Karakurt spider, *Latrodectus tredecimguttatus*. These cases were selected from a large number observed in Turkestan the general symptoms of which are as follows: At the site of the bite there appears a haemorrhagic spot or isolated petechiae and a slight swelling of the skin. There is acute local pain radiating into the adjoining areas, general weakness, copious sweating, and tremor in the legs, the patient being unable to stand. The pulse-rate is slow, respiration irregular, the temperature is slightly raised, there is insomnia, pains in the region of the solar plexus, marked *défense musculaire*, anuria and constipation. As regards the blood-picture, there is slight leucocytosis at the beginning (9,400) and about 5 per cent. of eosinophils by the third day. The symptoms persist from three to five days. *C. A. Hoare.*

GILBERT (Elmer W.) & STEWART (Charles M.). **Effective Treatment of Arachnidism by Calcium Salts. A Preliminary Report.**—*Amer. Jl. Med. Sci.* 1935. Apr. Vol. 189. No. 4. pp. 532–536. [29 refs.]

The authors publish five cases of *Latrodectus mactans* bite in which the intense pain was promptly relieved by injection of calcium salts. It is generally accepted, they say, that the venom directly stimulates the myoneural junctions or that it acts on the nerve-endings; since calcium depresses the neuromuscular junctions, salts of this metal were selected for trial. Intravenous injection of 10 per cent. $CaCl_2$ were found to give instantaneous and prolonged relief of pain, and to produce immediate relaxation of muscle spasm, but owing to its necrotic action on tissue outside a vein calcium gluconate (10 cc. of 10 per cent. sol.) was substituted, with complete success. The intramuscular route is preferable for children. The case records bear out the authors' statements. *A. G. B.*

UGANDA PROTECTORATE ANNUAL MEDICAL AND SANITARY REPORT FOR THE YEAR ENDED 31st DECEMBER, 1933. Appendix I. pp. 57–59.—**Annual Report of the Government Entomologist for 1933.**

In Uganda, the two most dangerous species of *Anopheles* are *A. gambiae* and *A. funestus*, whose pre-adult life-cycles, in approximately

natural conditions, were found to vary in length from 11 to 16 days in the case of the former, and from 20 to 21 days (two experiments only) in that of the latter. No mosquitoes were observed to breed in an unshaded gutter, an experiment which was continued. In shaded gutters *Aëdes aegypti* bred freely, but no Anopheline larvae were met with.

As regards fleas, it is considered that, at least locally in rural Buganda, *Xenopsylla brasiliensis*, as in certain districts in Kenya, is the chief carrier of plague ; and that the range of *X. cheopis*, which in Kampala is the more abundant species, is very restricted.

In West Nile, *Glossina palpalis* was found to be moderately abundant along the River Ora, and also in places on the Nile itself ; and both *G. pallidipes* and *G. morsitans* were locally common. For the protection of the population, which is living in close contact with *G. palpalis*, a limited amount of clearing on the Ora was thought advisable. In view of the scarcity of fly along part of the shore of Lake Edward and in the Katwe Forest, whence the neighbouring people originally derived their food, restricted advance into the damper portion of the Forest was recommended. On the other hand the " damp forested ravines " in Katwe, which yield hut-poles, but all of which are to some extent infested with fly, should remain closed. In the course of a brief survey of the Kagera River, within the confines of Uganda, *G. palpalis* was not found.

Regarding the prevalence at certain seasons of *Simulium damnosum* near Jinja it is interesting to learn that preliminary attempts at trapping this pestilent little fly have proved encouraging, and that the experiments, especially as to the lure of scent in this connexion, are to be continued [see this *Bulletin*, Vol. 31, p. 60]. *E. E. A.*

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YAKIMOFF (V.) & SOKOLOV (B.). On a New Coccidium, *Eimeria beckeri* n. sp., of the Ground-Squirrel, *Citellus pygmaeus* Pall.—*Rev. Microbiol., Epidémiol. et Parasit.* 1934. Vol. 13. No. 4. [In Russian pp. 331–334. With 2 figs. English summary p. 334.]

REVIEWS AND NOTICES.

PEIPING UNION MEDICAL COLLEGE. **Laboratory Manual of the Department of Bacteriology and Immunology.** Prepared under the Direction of C. E. LIM. Second Edition.—190 pp. With 3 figs. 1935. Peiping, China. [$1.50.]

The second edition of this little book, the first edition of which was reviewed in the *Tropical Diseases Bulletin*, Vol. 26, p. 867, hardly calls for any detailed comment. Some changes have been made and certain new matter has been introduced, but on the whole the new edition is very much like the previous one. The book still remains a guide to the various techniques employed in the Department of Bacteriology and Immunology of the Peiping Union Medical College, N. China, and is thus intended chiefly for local use. It gives the composition of the various media, solutions and stains used and the methods of carrying out the various reactions and tests which are undertaken in this department. The section devoted to the care and breeding of laboratory animals still remains a feature of the book, while additional information regarding the methods of examination for pathogenic fungi is given. As did the first edition, the new one deals with bacteriological and serological matters, the methods of blood examination and protozoal diagnosis being omitted. As a handy work of reference, though written for one particular laboratory in China, the book should prove very useful in any bacteriological department. *C. M. Wenyon.*

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